JULY 1961

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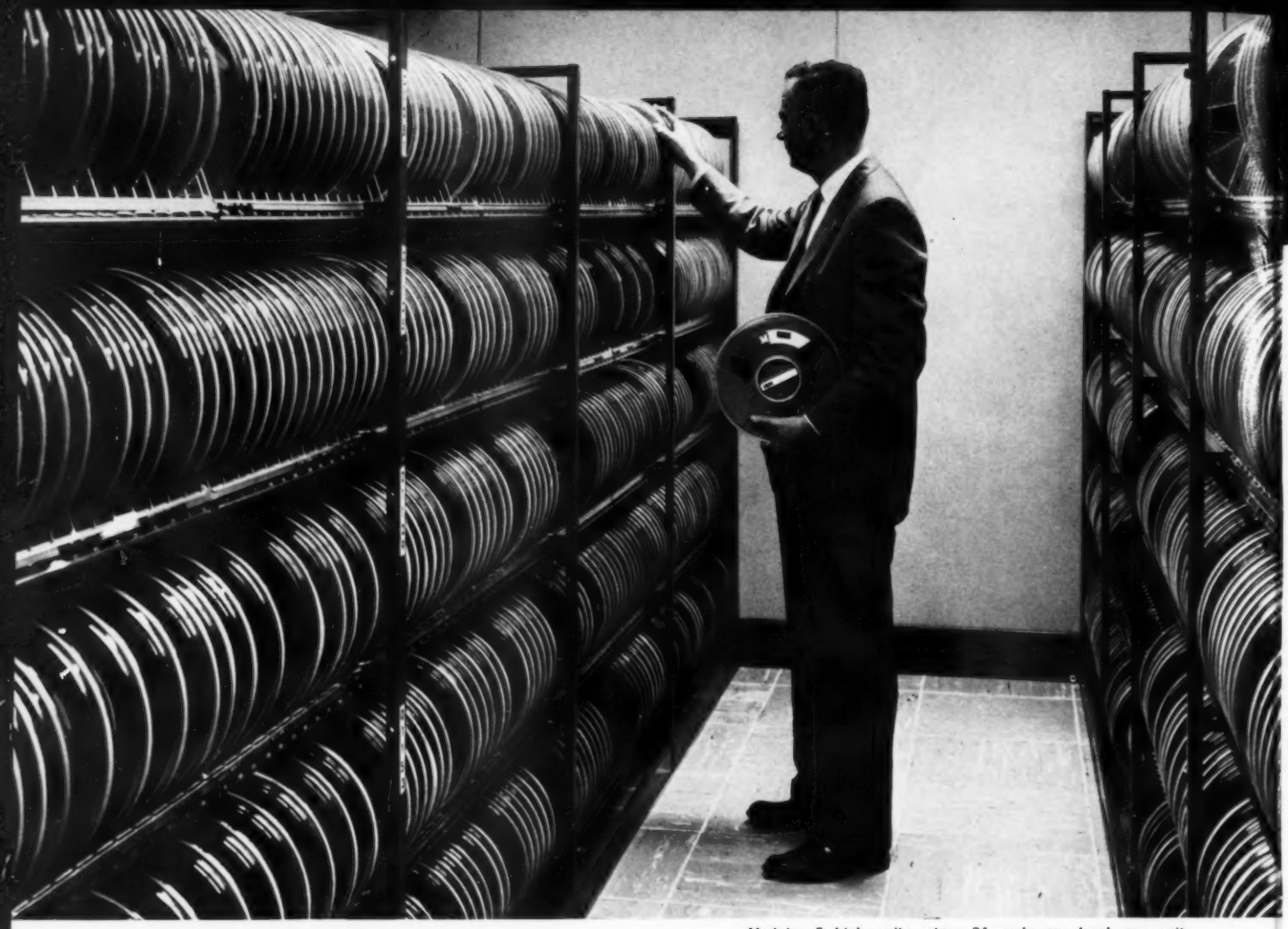
THE MAGAZINE OF AUTOMATIC OFFICE METHODS AND MANAGEMENT

- How to Write Effective Machine Room Procedure—page 26
- The Scope of Management Analysis—page 29
- Understanding a Manager's Function—page 34



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OBSERVATIONS . . .

from the publisher

Equipment Encyclopedia - A Milestone

AT THE TIME OF THIS WRITING we have just received our first bound copy of Volume One of the new two volume Data Processing Equipment Encyclopedia. This volume is entitled Electromechanical Equipment. (Volume Two — Electronic Equipment should also be finished by the time you read this.)

No single accomplishment has given us more satisfaction than completing this project. Probably because it is the first of its kind — the feeling of having created something new and worthwhile. Never before has a single source brought together all different types and models of data processing equipment described with such detailed specifications, including even current prices. All of the manufacturers literature used in compiling the Encyclopedias fills several large files in our offices.

This observations column is not intended to be a selling vehicle but rather to call to your attention items of interest. Most often these are related to happenings beyond our walls. But I would feel remiss in my duty if I failed to call your attention to this highly significant publishing event—and to publicly congratulate the editors and production people who combined their skills to bring this to you.

Frank H. Gille

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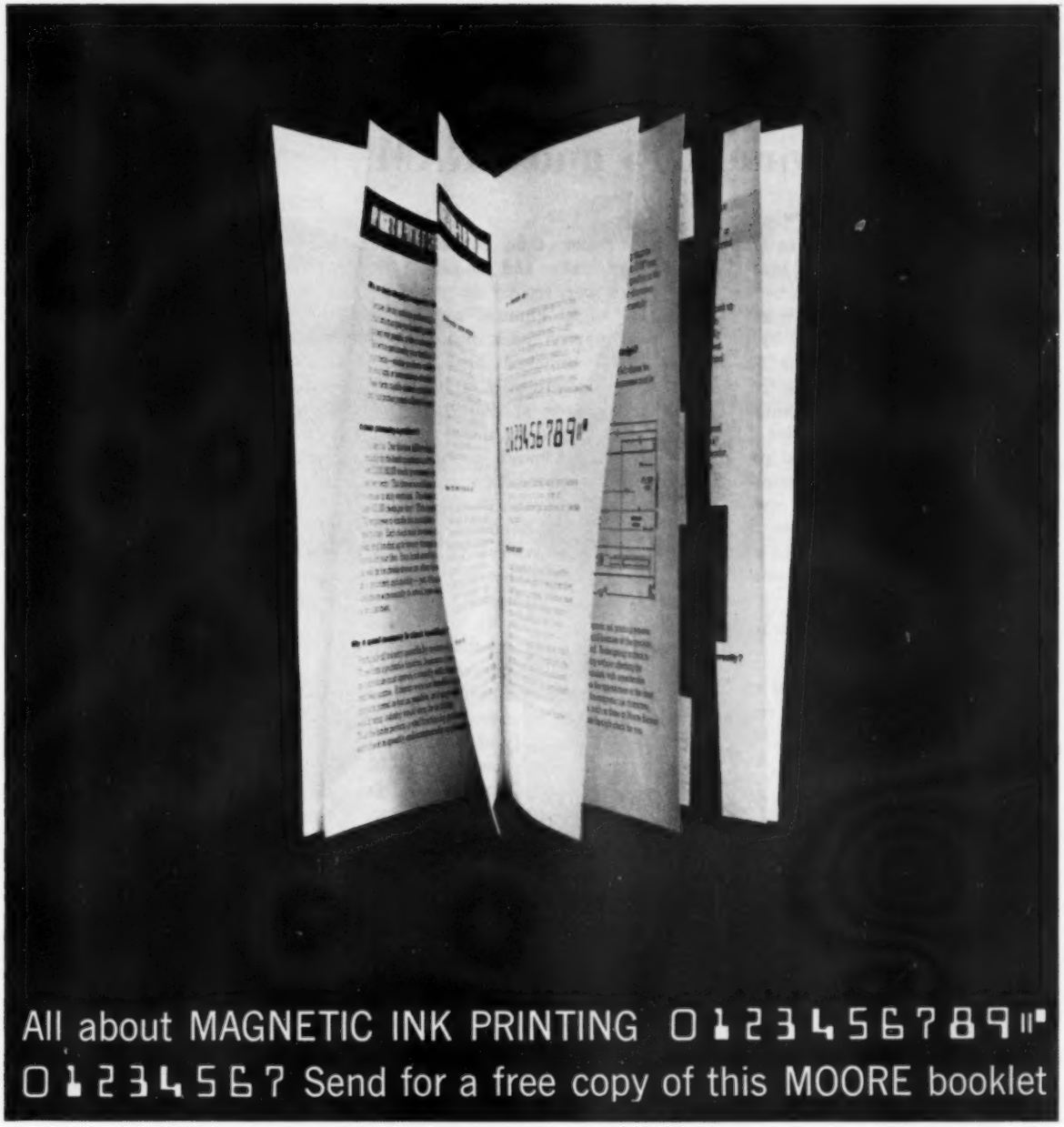
AUTHORS

RICHARD W. DAYHUFF *(Understanding a Manager's Function)* graduated from the University of Utah with a B. S. in industrial management. He has done graduate work in marketing and accounting at Brigham Young University, where he also taught punched card accounting. Since 1958 Mr. Dayhuff has been director of data processing at Brigham Young University. He has had articles published in various business and educational periodicals, including the 1960 *Data Processing Annual* and *Data Processing* magazine. (See January 1961 issue for "Data Processing and Higher Management.")

ROY N. FREED *(Data Processing for the Lawyer)* is a member of the American Bar Association Committee on Electronic Data Retrieval. A Yale Law School graduate, he was admitted to the Massachusetts and Pennsylvania Bars and served 10 years in the Antitrust Division of the U. S. Department of Justice. He is now associated with a Philadelphia law firm.

Mr. Freed has written a number of articles on data processing in relation to the law and has been active in spreading information about data processing to lawyers.

ROBERT A. NELSON *(How to Write Effective Machine Room Procedures)* is associated with the Statistical Tabulating Corporation, Los Angeles office. He has been engaged in data processing systems and consulting work for the past 14 years. His experience has included both feasibility studies and implementation of systems ranging in scope from manual to medium scale computers. Mr. Nelson was educated at Western Reserve University. In addition to his duties at Statistical Tab, he is presently an evening instructor in Systems and Procedure Development at Los Angeles Metropolitan College. ■



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DeParis on EQUIPMENT —A Monthly Feature

JOSEPH R. DE PARIS

National 315 and CRAM

Now the National Cash Register Company joins with the other major suppliers of electronic data processing equipment in offering a new generation solid state, building block design, computer system. The National 315 system is expandable from a relatively small scale system to one with large scale capacities. A general purpose unit, designed particularly for processing business data, the 315 has the internal speed and storage capacity to handle the intricate mathematical problems encountered in engineering and scientific work.

The National 315 is offered in four basic systems as follows:

1. *Basic processor*—a card system available with card reader and punch, paper tape reader and punch, and printer.
2. *Bank processor* — same as above with the addition of magnetic character sorters.
3. *File processor* — a magnetic tape and/or random access file system available with card and paper tape readers and punches, remote inquiry stations, up to 8 magnetic tape drives, and up to 16 card random access units. The combination of magnetic tape and random access units may not exceed 16.
4. *General processor*—the most sophisticated system available with all the input-output units offered in the basic, bank, and file processors.

Among the notable features of the 315 are the variety of input-output units, the large internal storage, fast internal speed, powerful command structure, and the unique card random access memory.

Input-output

Some of the characteristics of the input-output units follow. The punched paper tape reader reads photo-electrically and checks 1,000 characters per second in five, six, seven, or eight channel code, with automatic parity check on checkable codes. The punched card reader reads photo-electrically and checks 80 column cards at 400 cards per minute. (A 2000 cpm reader is available as well.) Though not buffered, the reader has timesharing through the demand interrupt feature.

Magnetic tape handlers come in two types: one provides 40 KC transfer rates with densities of 333 alphanumeric or 500 numeric characters per inch, the other up to 60 KC transfer rates with densities of 500 alphanumeric or 750 numeric characters per inch. For compatibility with IBM units, both handlers have a 24 KC mode with density of 200 characters per inch. Reels come in 3,600 feet lengths; reliability checking is accomplished both by dual write-read heads, and complete parity checking, i.e. character and longitudinal.

The paper tape punch operates at 120 characters per second, in four different channel codes, with automatic reliability checking. The printer prints 120 characters per line at 680 lines per minute alphanumeric, or 900 lines numeric. To output punched cards, a buffer is provided to control IBM devices which operate at either 100 or 250 cards per minute.

Central processor

The central processor has a minimum memory of 4,000 alphanumeric or 6,000 decimal digits, which can be expanded up to 80,000 alphanumeric or 120,000 numeric digits. Data is organized in words consisting of 12 bits representing either two 6-bit alphanumeric characters or three 4-bit decimal digits. Despite the fact that data is organized in fixed word lengths, variability is accomplished by the ability to specify variable length operands, i.e. a variable number of the word segments can be addressed as a unit.

The command structure is single address with a fixed length of two words per instruction. Over 60 commands are in the repertoire of the 315, augmented by 32 index and 32 jump registers.

Internal speeds are notably fast with a six microsecond access time, this being the time necessary to address one word cell. An operation of add A to B and store in C, where the fields and result are six digits each, takes 144 microseconds. Internally, operations are carried out serially and code is binary coded decimal.

The program interrupt feature, available with most of the peripheral devices, gives the 315, which is an on-line processing system, the ability to do what amounts to off-line processing. Program interrupt allows, on a time sharing basis, the interruption of the program under certain conditions, whenever a peripheral unit signals it is ready. With this feature, off-line printing may be done as follows. Whenever the print buffer is ready, a signal is transmitted which interrupts the program being processed long enough to fill the buffer. Then, while printing takes place, program operation is resumed.

CRAM

The truly unique feature of the National 315 is a new concept in random access data storage. This is the unit NCR has dubbed CRAM for Card Random Access Memory. Up to 16 magnetic card units may be operative in a system. Each unit contains 256 cards of mylar plastic, 14 inches long by 3¼ inches wide. Each card has seven tracks like strips of magnetic tape. Each track holds 3,100 alpha characters or 4,650 digits.

The 256 cards are permanently enclosed in a cartridge. The cartridges are removable from the CRAM units for each job just as magnetic tape

(continued on page 55)

FROM UNIVAC®

AUGUST 1960—Univac® Larc I, world's most powerful computing system, passes acceptance test

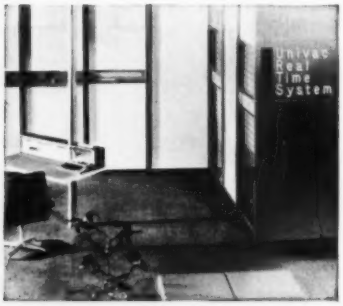
Univac Larc I has been operating since August 1960 at the Atomic Energy Commission's Lawrence Radiation Laboratory at the University of California. Only one other accepted computer in the Free World compares to Univac Larc I in size, speed, and power. The other computer: Univac Larc II—installed and now delivering results for the U.S. Navy, Bureau of Ships, David Taylor Model Basin. Univac Larc I and II are achievements which are equal in importance to the invention of the world's first electronic computer. All three, achievements of Univac.

DECEMBER 1960—Univac announces major breakthrough—new Univac 490 Real-Time System

Distance and time gap no longer limit the effectiveness of data communications. For now Univac 490 Real-Time System takes questions from hundreds of remote points, updates master records, and transmits answers in a matter of seconds.

For example, data fed to the central system over a communications network from distant, far-flung sales points can be used simultaneously to reduce your inventory, explode cost factors, and even alter production schedules when necessary. Or, in the case of an airline reservation system, the transmitted data could be constantly updating the system's seat inventory or passenger records.

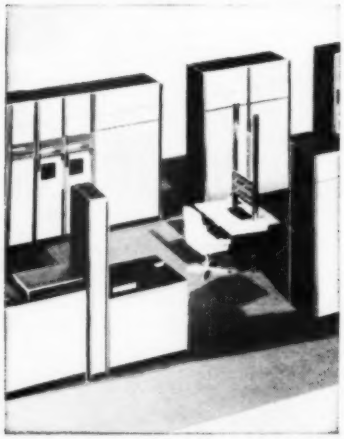
The new Univac 490 Real-Time System processes all data, corrects its files, and answers the problems of each location as if it were in the adjoining room.



DECEMBER 1960—World's first commercial thin-film memory computer introduced by Univac

Univac Division scientists have introduced ferromagnetic film which is the fastest and most advanced computer memory ever developed.

Coupled with this major advance came the first commercial computer of its type in the world, Univac 1107 Thin-Film Memory Computer. This powerful system provides fantastically fast access to stored information. Previous computers measured access time in millionths of a second. Now with Univac Thin-Film it is rated in nanoseconds—billionths of a second!



MAY 1960—Univac introduces a high-performance, low-cost data processing system: Univac III

Univac III offers large-scale performance at lower cost per unit of output than any other system in the market.

Developed by the men who invented the world's first electronic computer, Univac III incorporates the most advanced solid-state circuitry and data processing concepts. For example: because of a new character packing technique, information which previously required 20 reels of magnetic tape can be stored on only one reel of Univac III tape and read off at the rate of 200,000 digits every second.

No other commercial computer combines such great application flexibility, high-computing speeds and accurate performance in a single system!

2

MARCH 1960—New Compatible High-Speed Printer provides complete systems compatibility

From Univac, another giant step forward: the new Univac Compatible High-Speed Printer. Users of competitive equipment are no longer bound to one manufacturer.

Model I of the new Univac High-Speed Printer operates off-line with Univac systems. Model II operates off-line with computer systems of another leading manufacturer.

Both models have been thoroughly field tested and are already in use delivering dollar-saving advantages never before possible.

6

AUGUST 1960—Univac announces STEP—a computer plan that keeps pace with your growing needs

STEP—a solid-state system designed to take a business across the crucial step from mechanized tabulating into electronic data processing—was announced to Business-America by Univac in August 1960.

Univac STEP (Simple Transition to Electronic Processing) is economical, versatile, and can be installed without disturbing normal work. Yet there is nothing unsophisticated about it. Built around four units—a Central Processor, a High-Speed Reader, High-Speed Printer, and a Punch Unit—STEP can perform many varied record-keeping jobs. Examples are payroll, sales analyses, and production scheduling. And STEP'S building-block concept permits the addition of equipment options to meet increased data-processing needs.

3

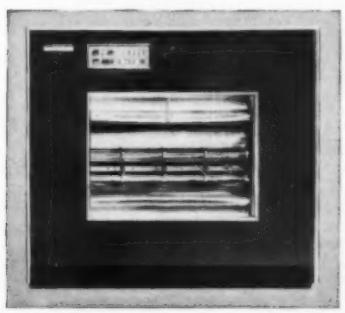
OCTOBER 1960—Univac scores again with development of Randex super-capacity storage system

Randex, the new Univac super-capacity drum system, stores over 24 million easily accessible characters per unit. And up to 10 units can be utilized for a total of a quarter billion usable storage positions.

Another big plus for Univac Randex is its remarkably fast access time—as low as 35 milliseconds to read or write 48 10-digit words and signs.

Designed for both Univac Solid-State and STEP Plan Computers, Randex accelerates and simplifies the processing of a wide variety of applications and gives users an extreme degree of versatility and flexibility.

7



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Marien on FORMS —A Monthly Feature

Evaluating Bids from Forms Printers

RAY MARIEN

IN MOST COMPANIES, the forms printing bill is small in comparison to other material purchases. For that reason its importance tends to be overlooked. This tendency is regrettable because forms printing offers far more opportunity for the economy-minded company to *save* money, than does a large volume purchased commodity such as steel, for example. The main reason for this is that many commodities and raw materials *have* a fairly predictable market price. Printing does not. It is not purchased by the pound, or yard, or truck-load, and its prices are varied because most of the jobs are *custom-made*. True, there are a few stock-form items, which large printers sell at established prices, but the great majority of forms are made to the customer's specific tastes.

The printing market is one which is wide open as far as price goes. The range is so broad that competitive bids may differ by as much as 100 percent! For that reason, the unskilled, or unknowing buyer of forms, who accepts the first price he is quoted, may sometimes be costing his company some of its hard-earned profits unnecessarily.

Conversely, the forms buyer who shops for his jobs may be able to add dollars to the company's profits, through skillful purchasing. This does not mean that a buyer should use price alone as his criterion in placing orders for business forms. The man who does that ends up getting just what he paid for — often less!

Considerations

A printing order should be placed after carefully evaluating service, quality, delivery and — price! The first three of those four vital factors can only be truly gauged on an historical basis. How have they been in the past? Every time you place an order with an untried vendor you have only his word for them. With your established vendors you at least have a performance record "in the book."

Assuming you are placing a forms printing order based on all four factors, if you request bids from only your established vendors, your decision is then based purely and simply on price.

If you request bids from new sources, your problems multiply. How good is their quality? How helpful is their service? And how dependable is their delivery? These factors must be investigated and noted, or you are taking a considerable risk. Especially if you are like so many others and are plagued with "rush" jobs. You simply can't afford to have the printer fail to meet any of those four hall-marks!

If you grade your sources equally as to the first three factors, then there is no reason to place the order with anyone but the lowest bidder. That is always dependent upon one important point, however. Are you sure they are all bidding on the same thing? To make sure, your printing specifications must be carefully prepared. They must be so drawn that there will be no chance for misinterpretation, no ambiguity, no "multiple choice" decisions on the printer's part. Every detail concerning composition, margin, punching, dimensions, paper stock, ink, carbon paper, wrapping, packaging, labeling, padding and so on must be in there so there can be no doubt of their meaning. And the delivery you request must be factual, not fanciful. Any failure on your part to provide complete, adequate specifications opens the door to inequities in the bidding. That is when you risk not getting what you wanted. That is when the low bid may be low because the printer guessed at the interpretation of some obscure specifications, and his guess was based on the cheapest way to do it.

Overruns

One extra proviso that you might make is to stipulate that the bidders establish a price per thousand for their overruns. That will give you an added yardstick for evaluating their quotations. They should charge you less per thousand for overruns, but many printers charge at the same rate as the base job. Your chances of getting a job without an overrun are pretty slim, and as long as you're paying for the "overs" you should know what they are going to cost you! ■

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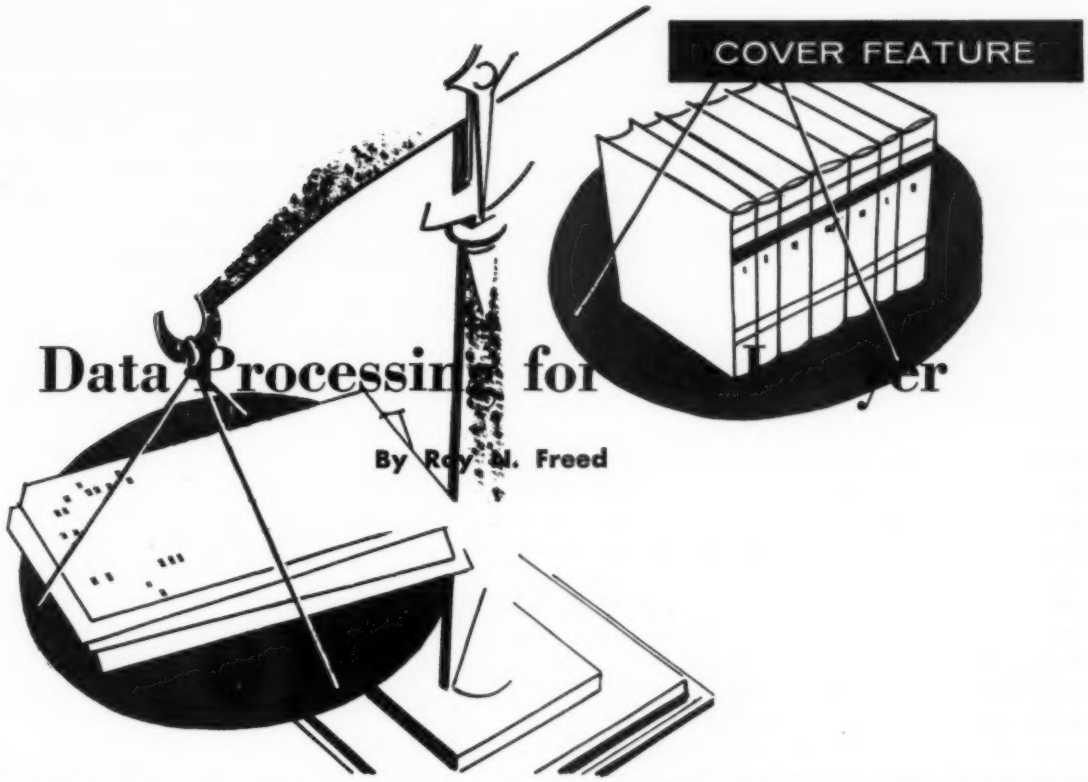


Data Processing for [illegible]yer

By Roy N. Freed

THE LAWYER who tries a big case should observe with envy the rational and efficient manner in which the businessman has harnessed machines for analyzing masses of data. Confronted with a mounting volume of paper work incidental to his primary activities such as manufacturing, selling, or making loans, the businessman has needed little encouragement to replace manual clerical operations with the various types of machine data processing systems available. He does so to minimize labor costs, human errors and operation time and to achieve economies and improve service.

By contrast, the lawyer has failed thus far to utilize in his professional work (as distinguished from office management as such and from statistical analysis of voluminous data) administrative tools from which his business client has benefited economically for many years. The lawyer's lethargy is indeed unfortunate for it has deprived him of aids to his professional performance and of potential economies.

The lawyer, whose duties predominately concern paper work, performs many repetitive operations that are ostensibly more amenable to machine management than those of his business client. A significant portion of legal effort entails the accumulation (either directly or through others) of large bodies of information and the searching through those masses for specific items. The two categories of voluminous legal data most readily identified are the vast library of case law and the mountains of trial evidence in certain types of major litigation. Through the law reports, lawyers in all fields constantly search for decisions on particular points. Through each assemblage of evidence, the trial lawyer continuously looks for all facts tending to prove particular contentions. The process of working with such kinds of legal material is, as an administrative technique, one of data retrieval, or, the location of specific items of information in a mass of stored facts.

Case materials

Efforts made thus far to devise a system for performing by machine that aspect of legal research represented by searching the case reports have not materialized. The intriguing prospect of looking up the law merely by pushing buttons, if not achieving the ultimate of writing a brief or a definitive decision in the same manner, will impel continued investigation in this area. However, the technical problems inherent in the subject matter of the law will probably postpone for a substantial time the accomplishment of these wonders. For reasons that will appear below, the primary handicap to harnessing in that fashion the entire body of the law is our inability to establish a universally applicable series of definitions of legal terms, concepts and topic classifications; to find in each decision all of the essential facts; and to agree upon a single, authoritative interpretation of each decision. It is, however, not unreasonable to expect much sooner a less ambitious system of decision searching, such as the simple assembling of super-

ficially relevant authorities in a narrowly circumscribed field of law. Nevertheless, the problem of devising a technique for doing legal research by machines will be left to those who have already devoted considerable effort to it, currently the Electronic Data Retrieval Committee of the American Bar Association, and it will not be considered any further in this article.

Evidence

With respect to trial evidence, however, the utilization of machine data processing is feasible today in major antitrust, patent, tax, minority stockholder, rate, license, and similar litigation before the courts and administrative agencies. Machine management of such data is practical because the volume of information involved is frequently substantial enough to justify the expense, and any system devised would be utilized by a relatively small group of persons who could readily agree on definitions of terms and concepts, factual analyses, and classifications. It would be the acme of legal efficiency to be able to marshal accurately and almost immediately from a trial record comprising thousands of exhibits and pages of testimony all of the evidence supporting particular positions or involving specific witnesses.

A dramatic example of the magnitude of data about which we are talking is the record in *United States v. United Shoe Machinery Corp.* The trial of that case produced a transcript of 14,194 pages, 5,512 exhibits totalling 26,474 pages, about 150,000 card reports of the use by shoe manufacturers of machinery manufactured by others than the defendant (not included in the 5,512 exhibits), at least 6,000 patents, and 47 depositions reported on 2,122 pages of transcript. This is far from an atypical situation.

Scope

This article will focus on the function, potential benefits, and mechanics of a data processing system in a single, "gigantic" case. The benefits to be achieved there, although limited primarily to individual law firms and their clients and to legal arms of governmental units rather than to the legal profession as a whole, are significant enough to merit serious consideration. This review will undoubtedly suggest the value of such a system to law offices in other "legal" situations, and ideally might even precipitate the more important ultimate application of researching case law.

Use of a data processing system for legal evidence

For the foreseeable future, the primary value of data processing systems to the lawyer is their ability to absorb large quantities of index-type information (as distinguished from the basic data itself) and to search out from it by categories, accurately and rapidly, references to the locations of the basic data in another file.

Since litigation management involves considerable data retrieval, the potential value of assigning the performance of that function to a machine merits especially careful study. Marshalling evidence is a regular operation during litigation, involving a number of extensive searches and innumerable checks for more limited points. Conceivably, all potential evidence is organized first at the very conception of the litigation, as the basis for drafting a complaint. Later, such evidence is assembled for the trial itself to prove the respective pleading or to test the veracity of the witnesses for the opposition by cross-examination. At the close of the case-in-chief, the record as then made is culled broadly to support or attack a motion to dismiss based on failure of proof. Ultimately, the entire record must be analyzed completely for the preparation of proposed findings of fact. In addition, the body of factual data is repeatedly searched for particular items.

Disadvantages of present techniques

The types of major litigation with respect to which this study is directed, namely antitrust, patent, tax, minority stockholder, rate, and license actions, frequently entail administrative elements of such a magnitude that considerations of cost and efficiency compel the investigation of new techniques. They involve prodigious quantities of evidence, both documentary and testimonial. Their preparation and trial extends over many years. (In *United States v. United Shoe Machinery Corp., supra,* the complaint was filed on December 15, 1947, after an extended preliminary preparation by the Government, and the opinion of the court was handed down on February 18, 1953. The hearings took 121 days plus the time devoted to taking depositions. And a veritable army of counsel is required to manage a single case. Such litigation thus earns the label, the "big case."

Because of its sheer bulk, the handling by traditional methods of the evidence in the big case suffers from a number of major pitfalls. Reliance upon human memory for the location of particular items of evidence in the preparatory accumulation of data or in the trial record is unsatisfactory. Important items are susceptible of being overlooked. Physical searches through stacks of data are not only very time consuming and costly, but are also subject to the vagaries of human perception and persistence. The inevitable compilation of lists and extensive cross-reference notations are similarly expensive. Finally, it is rare during the course of a large suit that lawyers, in whose minds so much of the essential factual knowledge is retained, do not leave the trial staff. On occasion,

the evidence might be so complex that it would be impossible for a new recruit to secure sufficient familiarity with the evidence in a reasonable time to be of any real value. The net result of reliance on usual methods is the simultaneous inflation of litigation costs and depreciation of professional performance.

Advantages of machine system

Consequently, the realities of the big case recommend serious consideration of the use of a data processing system. It entails no new steps in the preparation or conduct of the litigation. The establishment of a system of classification of the evidence and the analysis of each item in terms of such classifications are as essential for efficient evidence management without such a system as with one. Although the use of a machine will probably require more thorough classification, such added effort will contribute to better preparation and to a greater likelihood of success.

On the other hand, a data processing system would eliminate costs entailed in the shuffling of papers by professional as well as clerical personnel and would assure the permanent availability of every item of evidence that has been committed to it. It would marshal information by categories with speeds never before imagined by lawyers, a factor especially appreciated during the preparation for cross-examination on short notice. And it would assure a continuity of control over the facts regardless of personnel shifts. It has such additional advantages as the reduction in the volume and, hence, expense of copying items of evidence, and the elimination of the need to maintain overlapping files of documents by subject-matter categories.

Adoption of machine searching of trial evidence in no way sacrifices the remarkable facility of the human mind for uncovering new facets for exploration as the research progresses. The selection from the index of the topics to be examined closely is still a function of the lawyers. They will simply be spared, through the use of the machine, the burdensome task of assembling physically the data relevant to the selected topics. The efficiency of the lawyers will be increased by the delegation of non-professional tasks to the new devices.

As will be indicated in the succeeding section, the substantial advantages of a data system are available to the trial lawyer at comparatively nominal expense. However, considerations of sheer cost are not the primary factor for influencing a decision as to its adoption. It is impossible to assign a price tag to enhanced professional competence, an inevitable result.

Although the burdens of a major case would probably influence the adoption of a data processing system because the advantages for that purpose are most dramatic, once established, the system can be used by the law office not only on a number of cases simultaneously, but also for office accounting and statistical analysis as well. The capacity of a system is readily expandable by the addition of machines and operators.

Mechanics of a data processing system for legal evidence

Of the two general types of data processing systems available, the variety based on punched cards exclusively is preferable for handling legal evidence and will, consequently, be the one described in detail. Although electronic data processing systems (which may utilize punched cards as well as magnetic charges) are more versatile, since they operate at very great speeds and search the entire mass of recorded data directly in terms of the most minute combination of sub-categories, they have the dual disadvantages of substantially higher machine acquisition and operation costs and the need to print the information desired (or produce it as a newly created punched card). In addition to less expensive machines and less skilled operators, the punched card approach also uses the handy cards that themselves represent working tools, especially if the recorded data are printed at the top of the cards. Its requirement of occasional multiple or successive sorts to segregate data references common to different categories does not appear to be a serious defect, since at worst the longest sorting time is substantially faster and more accurate than human manipulation.

To install and operate a punched card system for trial evidence, the attorney must follow a series of steps outlined in the following checklists and discussed in detail immediately following them:

Adopt a sequential procedure

1. Devise a detailed case strategy.
2. Establish a system for classifying and recording how all items of evidence fit into that strategy.
3. Establish a code system for recording on cards and for searching through them.
4. Prepare an analysis-coding sheet by which the analysis can be signified and conveyed to the card puncher easily.
5. Analyze each item of evidence in terms of the trial strategy data classification.
6. Code the analyzed evidence for recording on punched cards.
7. Digest the item of evidence.
8. Record the analysis data by punching the cards in code.

(continued on next page)

9. Type the digest of the item on the reverse of its punched card.
10. File the evidence that has been analyzed.
11. File the punched cards.
12. Search through the punched cards.

Select the machines and equipment

1. Select the variety of cards.
2. Secure a card punch.
3. Secure a sorter.
4. Secure equipment in which to file the punched cards.
5. Consider a printing machine.

Assemble the necessary personnel

1. Lawyers to analyze the evidence.
2. Card punch operator to record the data.
3. Sorter operator to search out the data. (In most situations, sorting can be done by a card punch operator or file clerk.)
4. File clerk to handle the punched cards and the evidence.

Since each party has two separate bodies of facts with which to work during a law suit, the potential evidence and the trial record, a distinct series of data cards must be set up and maintained for each. The first set of cards will be superseded gradually by the second, as the underlying evidence-to-be either becomes part of the record or is discarded. It might be advisable to use different colored cards for the two sets so that they can be distinguished readily. Hence, creation of data cards is a continuous process that occurs as potential evidence is uncovered, and as evidence is admitted by the court, and that ceases only with the closing of the record. The same procedure, however, governs the making and use of both sets of cards.

PROCEDURE

Classification

After the trial strategy has been devised, in order to decide what information to record on the cards and in what form, it is necessary to determine the various fact categories in terms of which the evidence might be analyzed or organized to carry out that strategy as the litigation progresses. The preparation of a list of such categories is essentially the creation of an index to the evidence for sorting purposes. The bulk of the topics so listed relate to the facts that support the client's case. Although the subjects stem in large measure from the allegations of the party's respective complaint or answer, they will necessarily be much more extensive despite the frequent use of detailed pleading in major litigation.

Because of the importance of the list of subject topics to a data handling system, a sample compilation of fact categories has been created for a fictitious case to illustrate the various approaches. This appears on Figure 1 under the headings "Data Re Industry," "Data Re Defendant," "Extent and Effects of Violation," "Illegal Practices," and "Damages to Plaintiff." Although a workable subject index could be created exclusively of general categories, such as "Refusals to License," "Acquisition of Patents," and "License Negotiations," all of the evidence on any such point might be so voluminous as to require further breakdown. In that case, limiting topics, such as lists of specific products or companies, should be added for finer breakdown of the general groups. It will then be possible, for example, to sort out at least all evidence relating to license negotiations with the "Z" Company and even further limited to plastic molding machinery, if so desired. However, as will be explained, resort to such finer sorting by means of limiting topics may necessitate the use of more than a single basic card for each item. Similarly, where data relating to a particular general point is especially voluminous, the single sub-topic should be replaced by two, one for evidence supporting the client's position and another for that negating it.

Record must also be made on the cards of many collateral facts for procedural or tactical purposes. Figure 1 indicates under the headings "Nature of Evidence," "Type of Document," "Data Re Documents and Witnesses," and "Authentication," a few such additional factors. Persons' names are significant to enable the assembling of all papers relating to specific witnesses. Separation by types of documents would be necessary to locate all file memoranda for submission under a "business records" exception to the hearsay rule in the event of an objection to their admission. It might be important to segregate all agreements or patent licenses to which a particular company was a party. The ready identification of unauthenticated documents is essential in all cases.

In selecting the items to be recorded, generosity in quantity and detail contributes to the efficiency of the system. It permits greater flexibility of analysis as the case unfolds and new notions of strategy inevitably evolve, and it minimizes subsequent manual searches of the evidence itself, if it does not avoid them entirely. Determining as it does the effectiveness of the processing system, the selection of the facts to be recorded deserves the most expert and painstaking attention.

Coding

In order to translate the data to be recorded into card punchings, it is necessary to devise a code system. Although professional consultants and representatives of manufacturers of processing machines are available to assist in establishing such codes, an awareness of the elements of the coding process will facilitate the evaluation of the

processing system as a tool, as well as any discussions between the lawyer and consultant or machinery salesman on the subject. The lawyer will make a substantial contribution in creating a code, because he will have established the list of topics on which it is based.

Coding, for the purpose of this discussion, is essentially the determination of what information will be recorded on the cards as regular words and numbers, and what will be signified as symbols. This step is important because only a limited quantity of information can be entered on a single card of fixed size with standardized punchings. Consequently, the decision between words and symbols represents a compromise between two antithetical goals, the preference for easily readable terms instead of cryptic symbols on the one hand, and maximizing the amount of information per card on the other. Once the choice is made, selection and assignment of symbols, generally considered the very heart of coding, become almost automatic because of standard punching practice.

Cards

Although multiple basic cards can be used for each item of evidence, thus achieving an almost unlimited capacity for recording, a single basic card is to be preferred because it is so much easier to handle. If the names of all recipients of copies of documents and participants in reported conferences or meetings are recorded, as they should be, multiple cards will be unavoidable. However, such data can be placed on auxiliary cards that will be searched only for data relating to persons. A similar set of auxiliary cards could be established to record detailed data concerning the experiences of the witnesses, particularly their relationships with the parties, so that the representative qualities of the groups of witnesses produced by the respective parties can be compared for argument to the court.

(continued on page 18)

ABC CORP. v. XYZ CO. - EVIDENCE COVER SHEET

NATURE OF EVIDENCE
1.0 Plaintiff's witness.
1.1 Defendant's witness.
1.2 Plaintiff's exhibit admitted.
1.3 Plaintiff's exhibit excluded.
1.4 Defendant's exhibit admitted.
1.5 Defendant's exhibit excluded.
1.6 Pleading, stip., admiss. or interrog.
1.7 Plaintiff's deposition.
1.8 Defendant's deposition.

2-5. (For exhibit no., code no. for other item or wit.* - up to 9999.)

TYPE OF DOCUMENT
6.0 Letter.
6.1 Memo to person.
6.2 Memo to file.
6.3 Report.
6.4 Book, pamphlet or press release.
6.5 Lease.
6.6 Agreement.
6.7 License.
6.8 Chart or table.

DATA RE DOCUMENTS AND WITNESSES
7-12. [6] (Date of document.)
13-27. [15] (Author's name or witness' name.)***
28-32. [5] (Author's company, first party to agmt., licensor or lessor.)****
33-41. [9] (Author's dept. or other sub-divis.)****
42-56. [15] (Addressee's name.)***
57-61. [5] (Addressee's co., 2nd party to agreement, licensee, or lessee.)****
62-70. [9] (Addressee's department.)****

DATA RE INDUSTRY
71.A Description of markets.**
71.B Competitors.**
Shoe Manufacturing Processes:
71.C Goodyear welts.
71.D Cements.
71.E Moccasins.
71.F Other.
Types of Shoe Machines:
71.G Outside rapid lockstitch.
71.H Lacing.
71.I Rough rounding.
71.J Clicking.
71.K Eyeletting.
71.L Major machines generally.
71.M Minor machines generally.
Types of Shoe Factory Supplies:
72.A Nails and tacks.
72.B Eyelets.
72.C Cements.
72.D Lasts.
72.E Needles and awls.

DATA RE DEFENDANT
73.A Corporate structure.
73.B Subsidiaries, affiliates, etc.
73.C Internal lines of authority.
73.D Description of plants.
73.E Distribution methods.
73.F Source of products.**

EXTENT AND EFFECTS OF VIOLATION
74.A Share of the market statistically.**
74.B Share of market non-statistically.**
74.C Extent of patent coverage.**
74.D Non-competitive pricing.**
74.E Ability to control supply available**

ILLEGAL PRACTICES
75.A Acquisition of competitors.**
75.B Purch. of compet. mach. for junking.
75.C Acquisition of patents.
75.D Accumulation of patents by research.
75.E Refusal to license patent.**
75.F Patent coverage.**
75.G Infringement suits or threats.
76.A Tying to patent.**
76.B Tying to unpatented item.**
76.C Compulsory leasing of machines.
76.D Long lease term.
76.E Return charges in leases.
76.F Furnishing service at no extra chg.
76.G Belief that use of competitive items will jeopardize service.
76.H Fighting machines.
76.I Specific exclusion of compet. item.**

DAMAGES TO PLAINTIFF
77.A Loss of sales and profits.**
77.B Readiness and ability to compete.**
77.C Specific addit'l. expenses incurred.
77.D Loss from meeting cut prices.

AUTHENTICATION
78.A Submitted to defendant.
78.B Authenticated by defendant.
78.C Authenticity must be proved.

* Witness code number may be omitted if witnesses' names are used in columns 13-27.
** If a specific product is involved, so indicate by also checking that product.
*** Two initials and last name.
**** Standardized abbreviation.

Comments: _____

Related evidence: _____

FIGURE 1.
Blank sample analysis-coding sheet.

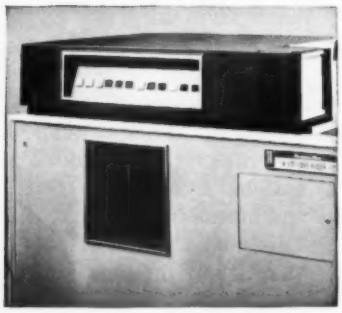
8

JANUARY 1961—**Univac Solid-State and STEP Plan Computers equipped to handle competitive magnetic tape**

New Compatible Synchronizers with modified tape units—developed by Univac Division—permit Univac Solid-State and STEP Plan Computers to directly handle competitive magnetic tape systems.

Because of this new development, users of large-scale competitive equipment who are ready to reinforce their installations with satellite systems can now take full advantage of the more versatile internal memory capacity of Univac Solid-State Computers.

This will mean far better performance in satellite system applications, such as short runs, one-time jobs, and special analyses and reports which are not practical to program on large-scale systems.



9

JANUARY 1961—**Short-card feed announced for Univac High-Speed Reader**

A new short-card feed option for Univac Solid-State and STEP Plan High-Speed Readers now makes possible computer processing of stub cards.

The 90-column reader will accept 16, 27, and 29 as well as full 90-column cards. The 80-column reader will accept 22, 23+, 51 and 66, as well as full 80-column cards.

Switching between card sizes in any given system can be accomplished in a matter of minutes. All you need do is adjust the card transport mechanism to accommodate the desired card size. Short card documents can then be processed at the same fast speeds and with the same high degree of reliability as full-size cards.

12

SEPTEMBER 1960—

Univac introduces another first for 90-column punched-card users: new Univac Optical Scanning Punch

The new Univac Optical Scanning Punch translates ordinary pencil marks into machine language. Any soft black lead pencil may be used and no special symbols are needed. It reads and punches up to 6000 digits per minute—senses and punches up to 40 columns of marking on one side, 80 columns using both sides.

Now, with the Optical Scanning Punch, you can record data at its source and automatically convert it into machine language for faster, more efficient data processing. You can automate your order processing—control the inventory with new speed and accuracy—mechanize your complete accounting operation.

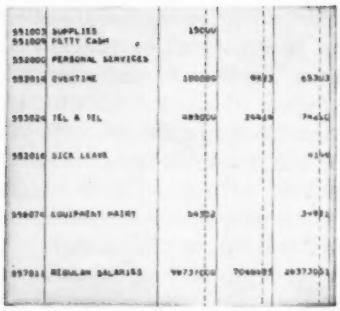
13

NOVEMBER 1960—**Univac develops new Photoelectric Key Verifier**

Univac introduces another new development in tabulating equipment—the Photoelectric Key Verifier! It photoelectrically senses errors in punched-card data and segregates error cards.

In one pass, the new Photoelectric Key Verifier can verify either Univac 64-character punching, or standard 90-column, 37-character punching, used by tabulating machines.

With its foolproof method of operation, the new Univac Photoelectric Key Verifier assures the highest quality of input accuracy—a factor vital to data processing efficiency.



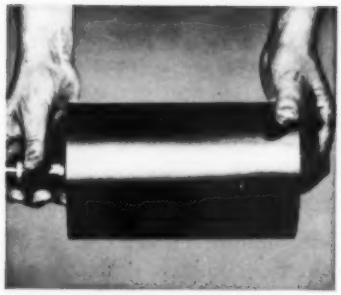
10

JANUARY 1961—New variable line spacing option for Univac Solid-State and STEP Plan high-speed printers

Thanks to this new development, the Univac High-Speed Printer will print eight lines per inch rather than the standard six lines per inch. And by programming the unit to advance two lines at a time instead of one, it will print three lines per inch under six lines per inch control, or four lines per inch under eight lines per inch control.

This is a distinct advantage since the four lines per inch mode is usually required for continuous tabulating card forms and various other documents. What's more, considerable savings in paper and space can be realized.

11



JANUARY 1961—9200-word drum developed for Univac Solid-State 80/90 central processors

Data-processing specialists have frequently stated that the most significant factor in determining computer efficiency is the internal memory capacity of the system. Univac Solid-State Computers have always had a large memory and now it's increased still more—9200 ten-digit words plus signs!

Here are some of the numerous benefits to be derived from this new feature: one-run processing; elimination of extra setups, reduced operator intervention, lessened processing time, increased versatility, simplified programming.

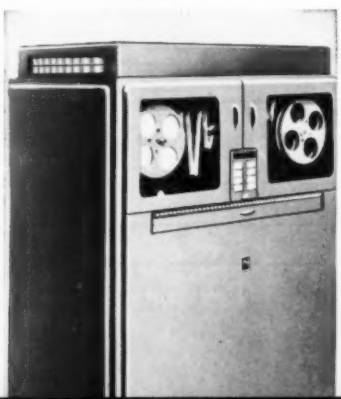
14

FEBRUARY 1960—Paper Tape Reader for Univac 60 and 120 Computers perfected by Univac

From Univac—a new development for today's modern business data processing—a common language Paper Tape Input device for Univac 60 and 120 Computers.

The new Paper Tape Reader permits data on paper tape to be fed directly into the computer. It processes common language paper tape prepared by tape-punching typewriters, wire communication equipment, and transaction recording and window posting machines, at the rate of up to 8800 characters per minute.

This new Univac unit completely eliminates the need for separate tape-to-card conversion, providing greater time-savings and money-savings in data processing systems.



15

FEBRUARY 1960—Selective Posting Interpreter developed by Univac

Another major development by Univac in tabulating equipment—the Selective Posting Interpreter. This highly versatile machine senses information from a selected master card in a group of master cards, retains the information, and prints it on every card that follows. By control punching, sensing is suppressed from all other master cards. Once a setup has been made, it will be retained for printing on all cards until cleared by control punching. There are no limitations to the number of detail cards which can be printed from each master card group.

more to come from UNIVAC

Circle nos. 8 through 15 on readers Service Card

(continued from page 15)

The volume of data recordable on a card can be characterized as a single line of typing with space for 80 letters. (This is the capacity of the card usable on machinery offered by International Business Machines. The card for Remington Rand equipment has 90 vertical columns.) The card has 80 vertical columns, each of which has 12 spaces or locations for holes. On the stock cards, 10 of these spaces are numbered "0" through "9," and provision is made for two additional spaces above the numbered section. Under the standard system of punching, it is anticipated that each individual vertical column will be punched to mean either a separate letter of the alphabet or a single digit number from "0" through "9". To accommodate 26 letters by the use of only 12 horizontal spaces, multiple punching in the same column is resorted to. Adjoining columns can be grouped for the punching of words or multi-digit numbers. If cards were punched in normal prose, the 80 columns would accommodate about 14 words, including punctuation, a profligate use of precious space. Since words are unnecessarily bulky labels for concepts, the definitions of which can be agreed upon, their use should be limited to names of persons, and number-letter symbols (*e.g.* 17.C) should be used primarily. Even names of persons could be assigned numbers, but the probable variety and multiplicity would usually entail such constant reference to a code sheet as to nullify the saving of space. It is recommended that 15 columns be allowed for a person's name. While recording in terms of words consumes at least two adjoining columns for a single fact, by using symbols a single column can provide for any one of as many as 26 sub-topics under a major topic and a pair of columns allows for any one of a maximum of 676 such sub-items. 676 is the product of two series of

ABC CORP. v. XYZ CO. - EVIDENCE COVER SHEET 1 of 2

NATURE OF EVIDENCE
- 1.0 Plaintiff's witness.
- 1.1 Defendant's witness.
- ✓ 1.2 Plaintiff's exhibit admitted. TR 439
- 1.3 Plaintiff's exhibit excluded.
- 1.4 Defendant's exhibit admitted.
- 1.5 Defendant's exhibit excluded.
- 1.6 Pleading, stip., admiss. or interrog.
- 1.7 Plaintiff's deposition.
- 1.8 Defendant's deposition.

2-5. 617 (For exhibit no., code no. for other item or wit.* - up to 9999.)

TYPE OF DOCUMENT
- 6.0 Letter.
- 6.1 Memo to person.
- 6.2 Memo to file.
- 6.3 Report.
- 6.4 Book, pamphlet or press release.
- ✓ 6.5 Lease.
- 6.6 Agreement.
- 6.7 License.
- 6.8 Chart or table.

DATA RE DOCUMENTS AND WITNESSES
- 7-12. 11/20/43 [6] (Date of document.)
- 13-27. L.K. GREENLEY [15] (Author's name or witness' name.)***
- 28-32. XYZ [5] (Author's company, first party to agmt., licensor or lessor.)****
- 33-41. EYELET [9] (Author's dept. or other sub-divs.)****
- 42-56. R. JOHNSON [15] (Addressee's name.)***
- 57-61. ANDVR [5] (Addressee's co., 2nd party to agreement, licenses, or lessee.)****
- 62-70. PURCH [9] (Addressee's department.)****

DATA RE INDUSTRY
- 71.A Description of markets.**
- 71.B Competitors.**

Shoe Manufacturing Processes:
- 71.C Goodyear welts.
- 71.D Cements.
- 71.E Nucleating.
- 71.F Other.

Types of Shoe Machines:
- 71.G Outside rapid lockstitch.
- 71.H Lacing.
- 71.I Rough rounding.
- 71.J Clicking.
- ✓ 71.K Eyeletting.
- 71.L Major machines generally.
- 71.M Minor machines generally.

Types of Shoe Factory Supplies:
- 72.A Nails and tacks.
- ✓ 72.B Eyelets.
- 72.C Cements.
- 72.D Lasts.
- 72.E Needles and awls.

DATA RE DEFENDANT
- 73.A Corporate structure.
- 73.B Subsidiaries, affiliates, etc.
- 73.C Internal lines of authority.
- 73.D Description of plants.
- 73.E Distribution methods.
- 73.F Source of products.**

EXTENT AND EFFECTS OF VIOLATION
- 74.A Share of the market statistically.**
- 74.B Share of market non-statistically.**
- 74.C Extent of patent coverage.**
- 74.D Non-competitive pricing.**
- 74.E Ability to control supply available**

ILLEGAL PRACTICES
- 75.A Acquisition of competitors.**
- 75.B Purch. of compet. mach. for junking.
- 75.C Acquisition of patents.
- 75.D Accumulation of patents by research.
- 75.E Refusal to license patent.**
- 75.F Patent coverage.**
- 75.G Infringement suits or threats.
- 76.A Tying to patent.**
- ✓ 76.B Tying to unpatented item.** (By 5)
- 76.C Compulsory leasing of machines.
- 76.D Long lease term.
- 76.E Return charges in leases.
- 76.F Furnishing service at no extra chg.
- 76.G Belief that use of competitive items will jeopardize service.
- 76.H Fighting machines.
- 76.I Specific exclusion of compet. item.**

DAMAGES TO PLAINTIFF
- 77.A Loss of sales and profits.**
- 77.B Readiness and ability to compete.**
- 77.C Specific addit'l. expenses incurred.
- 77.D Loss from meeting cut prices.

AUTHENTICATION
- 78.A Submitted to defendant.
- 78.B Authenticated by defendant.
- 78.C Authenticity must be proved.

* Witness code number may be omitted if witnesses' names are used in columns 13-27.
** If a specific product is involved, so indicate by also checking that product.
*** Two initials and last name.
**** Standardized abbreviation.

Comments: _____

Related evidence: _____

FIGURE 2.
Sample analysis-coding sheet marked up.

the 26 letters of the alphabet each. A double column symbol would be "17.AJ."

In the coding process, the vertical columns of the cards, either individually or in groups of adjoining columns, are assigned to particular general categories of information on the index that has been developed. Each separate column or group so labelled is called a "field." Cards can be purchased specially printed with the titles of the various fields, a step that probably does not merit the effort or expense. All cards in the same series have the same column meanings regardless of the type of evidence covered and of the absence from any item of evidence of information relating to any of the index topics, because the cards are searched as a group and only in terms of the presence or lack of holes in generally assigned locations. As a result, some cards may be substantially perforated while others will have few holes. The omission of punching is as much a record as is the reverse situation.

Once the columns are given meanings, the creation of symbols and their assignment to categories of data entail practically no discretion. As each major category on the index of topics to be recorded symbolically is assigned to a column, it takes that column number as the initial part of its symbol. Then, each subordinate topic receives that column number plus a consecutively higher letter or number as a suffix. Thus, a sub-category symbol would be, for example, "17.C" or "17.3." Figure 1 reveals an extensive system of symbols created in just this fashion. However, since only a single letter or number (and hence sub-topic) may be punched in a column, an effort must be made to avoid the inclusion in any column of multiple sub-topics that might be related to the same item of evidence. To escape such overlapping, the topics of a major category should preferably be divided into a number of columns where necessary. Otherwise, multiple basic cards must be made, as described below.

Analysis-coding sheet

When the details to be recorded by punching and the coding system have been established and committed to paper, an analysis-coding sheet will have been created automatically. Figure 1 is just such a device. It serves the dual purpose of first conveying directions to the card puncher, and later providing a permanent guide to the underlying item of evidence. As the lawyer analyzes a piece of evidence, he signifies its relevance to the case merely by entering check-marks in the boxes to the left of the code symbols for the appropriate sub-topics. He would also write in the proper boxes, preferably with colored pencil, such information as exhibit number, document date, or witness' name. This analysis is transposed to a card merely by the operator's punching the items so entered on the form. Thereafter, the sheet should be attached to the face of the item of evidence to which it relates to serve as a ready reminder of the significance of the item. For most efficient use, the analysis-coding sheet, like the punched card, should be only one page in length.

Evidence analysis and its recordation

Generally, evidence analysis will be a straightforward operation, and only one basic card will be made for each item of evidence. However, if any item contains data relating to two or more limiting index entries that could be punched in the same column, multiple cards must be made up identical in all respects, except for separate punchings on each for each of the conflicting limiting entries and their related basic categories. For example, if a memorandum reports on negotiations with two companies that involve different products, separate cards will record each company and the particular product, but both cards will carry identification of the memorandum and any other facts common to both transactions. Where multiple cards are

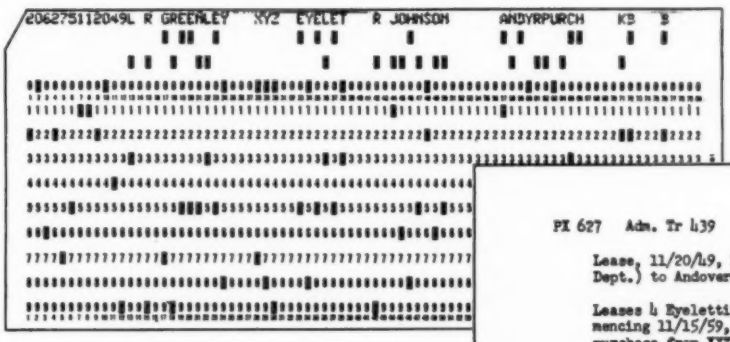


FIGURE 3.
Card punched to reflect Figure 2.

PX 627 Adm. Tr 439

Lease, 11/20/49, XYZ Co. (by L. R. Greenley, Mgr., Eyelet Dept.) to Andover Corp. (by R. Johnson, Purch. Dept.)

Leases 4 Eyeletting Machs., Mod. J, for 10-year period commencing 11/15/59, with lessor's option to renew. Requires purchase from XYZ of 70% of eyelets used in machs., at prices specified (Pg. 5).

Note: Cancelled by XYZ 6/30/53, per PX 840, for outside purchs. of eyelets.

FIGURE 4.
Mock digest of document analyzed on Figure 2 and punched on Figure 3, to appear on reverse of Figure 3.

called for, multiple analysis sheets must be filled out, either completely or by reference, to guide the card puncher. Each such card should bear some written notation to indicate that it is one of a series, as, for example, "1 of 3."

All items of an evidentiary nature must be analyzed and recorded on cards. This includes not only documentary exhibits and testimony, but also the pleadings, stipulations, answers to interrogatories, admissions, and depositions of all parties.

Being guides through the evidence, the punched cards should contain references to the specific pages of the record transcript or of lengthy documents where the data within the indicated subcategories are located. However, since it will not be necessary to search the cards to determine the various categories of facts appearing on a particular page of the record or a lengthy document, such page references need not be punched in the cards but may merely be written on them. To this end, the lawyer analyzing the evidence should write the record page on the code sheet next to the checked sub-topic, and a similar page notation should be made by the card puncher on the card, adjoining the punched hole.

To achieve maximum utility from the punched cards and reduce resort to the actual evidence, a digest of each item, made by the lawyer analyzing it, should be typed on the reverse side of the card or at least on the first card if there will be more than one per item. If this is done, page references to the record or lengthy documents might be incorporated in such a digest rather than on the face of the card. The presence of holes in the cards should not interfere with the legibility of such a digest. The card size should be adequate for a brief workable abstract of a document of average size. Since it might be preferable for the digest to appear on the face of the card, consideration might be given to using specially printed cards that will be blank except for the row of column numbers.

Figure 2 is a sample analysis coding sheet marked up to simulate an actual sheet; Figure 3 is a card punched to reflect the entries on the sample sheet; and Figure 4 is a mock digest of the document purportedly so analyzed and recorded. Figure 5 is a segment of an analysis coding sheet with marginal comments on the use of such a form.

Filing

After analysis, the evidence should be filed according to a system that permits ready location of specific items. If a filing system based on other than a purely consecutive numerical, alphabetical or chronological arrangement is used, the location of each document should be indicated in writing on its punched card.

The punched cards will also be filed in a rational system for ready reference. The set of cards for potential evidence should be segregated from that for evidence submitted in the record. Within each group, cards for witnesses, documents and such other evidentiary sources as stipulations and admissions should probably be filed separately. Cards may be secured in different colors to aid in distinguishing the various types of evidence.

A punched card system has some weaknesses stemming from the use of cards, for which allowances must be made. Since the cards will be used by the lawyers as working tools, their location must be known to the file clerk at all times. The ability to assemble all of the relevant cards for a search is very important, because a search of the incomplete file of cards will not indicate the fact of its incompleteness and will run the risk that important data will be overlooked. This deficiency with respect to punched cards is no greater than where the documents themselves are used directly. Since data records are not removed from a system utilizing magnetic charges, that approach substitutes security of the files for the flexibility of punched cards as working tools. Another, but less inconvenient precaution, is the need to protect the condition of the cards. They should not be folded or torn lest they not flow through the sorting machine accurately. However, damaged cards can be duplicated easily. Being made of paper, cards tend to absorb moisture and become limp, thus reducing the efficiency of the sorting machines. Consequently, cards give best service in an air conditioned environment. Where they will be stored for any extended period, cards tend to stick together because of moisture absorption. To minimize this problem, specially treated cards with sealed edges should be used.

Use

Obviously, it is more economical to use the machines as intensively as possible up to their full capacity. They can and should be used on more than one case contemporaneously, thus reducing the cost of operating them attributable to any single case and client. The machines can also be used for office bookkeeping, thus achieving greater economy of investment. This is the classic technique of spreading the overhead costs. Being standard machines, this method of utilization is entirely feasible. Only the respective sets of cards have any relationship to specific cases.

PERSONNEL

Lawyers

The lawyers assigned to analyzing evidence for card punching should be fully aware of the capabilities and limitations of machine data processing. They must take the initiative to adjust their normal

methods and to alter the system itself to avoid deficiencies of the method and achieve its full potential. The more complete knowledge they have of the elements of the case, the trial strategy, and the evidence available, the more efficient will be their job of creating a valuable file of evidence.

Punch operators

Card punch operators will very likely devote only part of their time to that operation for extended periods. Hence, they should be qualified to perform other functions such as typing, sorting, or filing. Their salaries are about the same as those of well qualified secretaries. Existing office personnel could be readily trained to operate such machines.

Sorters

The only skill required for operating a sorter is the ability to set up the sorting panel by setting buttons. This could be readily acquired by a person with an absolute modicum of mechanical aptitude. Cards are fed to it merely by being placed in stacks in a well and are received from it in similar stacks. During most of the operating time, no attention is required.

File clerks

Filing of punched cards entails no more and probably substantially less skill than other types of filing. Practically no discretion is entailed in determining where to place the cards.

Cost considerations

Considering the relatively low cost of the essential machines, the small specialized staff required to operate them, all of whom could perform other secretarial duties when not needed on the machines, and the elimination of many expenses involved in current manual evidence handling, any net additional cost in using a data processing system would be nominal. It is even a fair likelihood that an actual saving would result.

(continued on page 24)

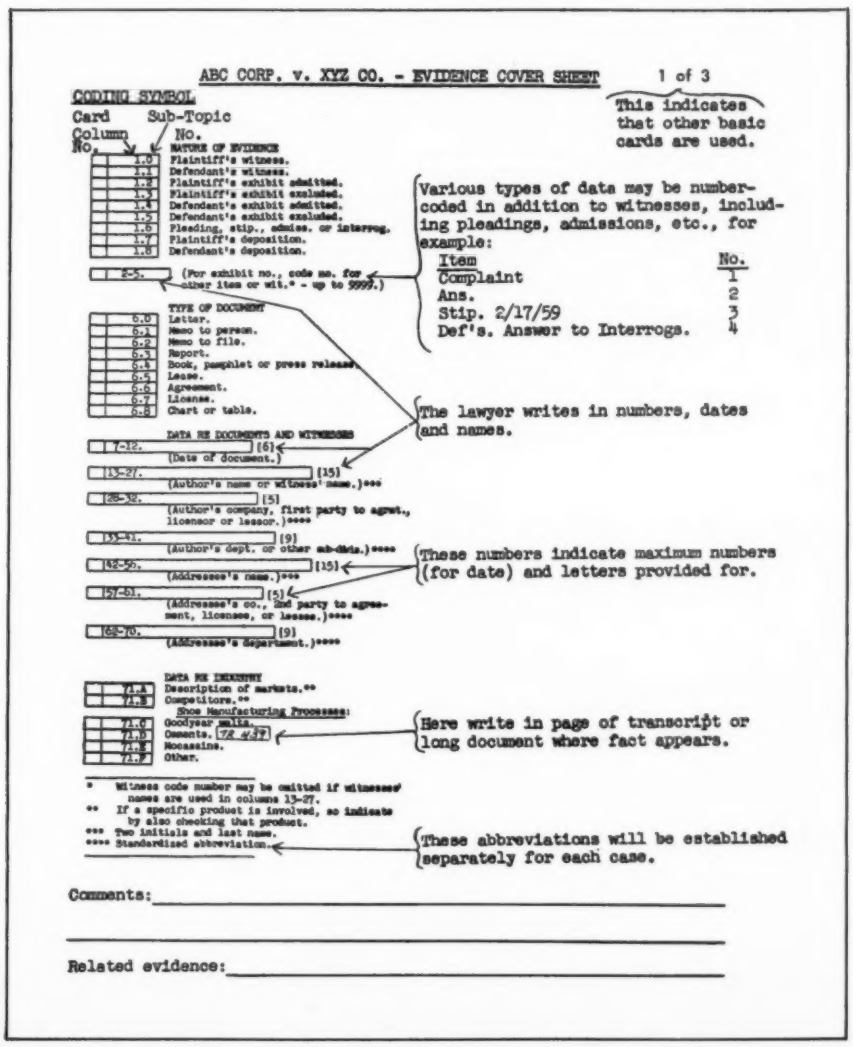
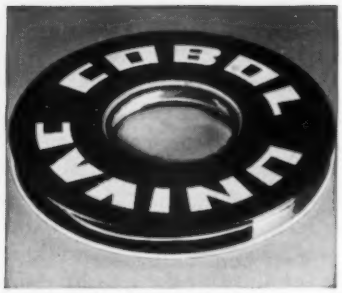

ABC CORP. v. XYZ CO. - EVIDENCE COVER SHEET
1 of 3
This indicates that other basic cards are used.
CODING SYMBOL
Card Column No.
Sub-Topic No.
NATURE OF EVIDENCE
1.0 Plaintiff's witness.
1.1 Defendant's witness.
1.2 Plaintiff's exhibit admitted.
1.3 Plaintiff's exhibit excluded.
1.4 Defendant's exhibit admitted.
1.5 Defendant's exhibit excluded.
1.6 Pleading, stip., admiss. or interrog.
1.7 Plaintiff's deposition.
1.8 Defendant's deposition.
2-5. (For exhibit no., code no. for other item or wit.* - up to 9999.)
Various types of data may be number-coded in addition to witnesses, including pleadings, admissions, etc., for example:
Item — No.
Complaint — 1
Ans. — 2
Stip. 2/17/59 — 3
Def's. Answer to Interrogs. — 4
TYPE OF DOCUMENT
6.0 Letter.
6.1 Memo to person.
6.2 Memo to file.
6.3 Report.
6.4 Book, pamphlet or press release.
6.5 Lease.
6.6 Agreement.
6.7 License.
6.8 Chart or table.
The lawyer writes in numbers, dates and names.
DATA RE DOCUMENTS AND WITNESSES
7-12. [6] (Date of document.)
13-27. [15] (Author's name or witness' name.)***
28-32. [5] (Author's company, first party to agmt., licensor or lessor.)****
33-41. [9] (Author's dept. or other sub-divis.)****
42-56. [15] (Addressee's name.)***
57-61. [5] (Addressee's co., 2nd party to agreement, licensee, or lessee.)****
62-70. [9] (Addressee's department.)****
These numbers indicate maximum numbers (for date) and letters provided for.
DATA RE INDUSTRY
71.4 Description of markets.**
71.5 Competitors.**
Shoe Manufacturing Processes:
71.6 Goodyear welts.
71.9 Cements. 72 4-27
71.8 Moccasins.
71.7 Other.
Here write in page of transcript or long document where fact appears.
* Witness code number may be omitted if witnesses' names are used in columns 13-27.
** If a specific product is involved, so indicate by also checking that product.
*** Two initials and last name.
**** Standardized abbreviation.
These abbreviations will be established separately for each case.
Comments:
Related evidence:

FIGURE 5.
Segment of blank analysis-coding sheet with marginal comments and suggestions.



16

DECEMBER 1960—COBOL goes into action with help of Univac

During a demonstration conducted December 6th and 7th, before the Executive Committee of the government-sponsored conference on Data Systems Languages, Univac played a vital role in what was called "an important milestone in the progress of data processing."

Using COBOL (Common Business Oriented Language), our technicians programmed the Univac II in English to display the practicality of COBOL as an effective programming language for business-type problems. This same Univac COBOL program, with minor modifications, was then successfully compiled and run on another manufacturer's computer system.

With Univac COBOL your employees can learn to program in days instead of weeks, program changes are made more accurately and faster, and programming costs are substantially lower.

17

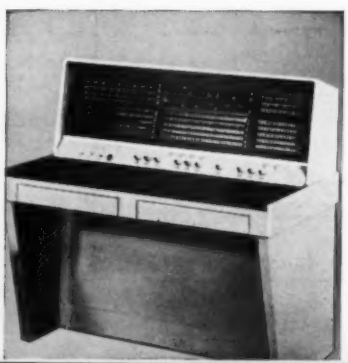
DECEMBER 1960—New Univac laboratory houses one of the largest computation centers in the world

Univac's new Engineering Center in Whitpain Township, Pennsylvania, features one of the world's largest and most complete computer centers. When completed, this modern fully-equipped research and development facility will contain working installations of the full spectrum of Univac equipment. Keeping pace with the Univac program of planned growth, this new center covers over 300,000 square feet of floor space with adequate room for expansion. The facility serves as a work center for engineering and programming projects, and also aids in strengthening our continuing program to provide you with better, more advanced service.

20

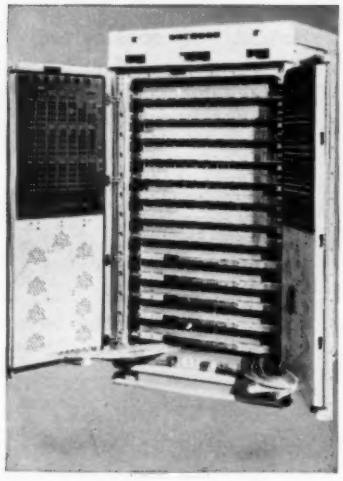
AUGUST 1960—Univac develops advanced Real-Time Computer for U.S. Navy

A new, extremely compact electronic computing system which collects, processes, and evaluates naval tactical data—and recommends courses of action in virtually "zero" time—has been developed for the U.S. Navy by Univac. One of the fastest computers ever built, it completes an instruction in only 20 millionths of a second. A general-purpose, stored-program computer, its random-access memory can hold one million bits of information. Thirty of these bits may be extracted from any location in the memory in only 2.5 millionths of a second!



20

Circle nos. 16 through 20 on readers Service Card



DECEMBER 1960—Univac perfects new Military Real-Time Computer

The Univac 1206 Military Real-Time Computer is a general-purpose computer built to rigorous military environmental specifications. It operates under the most severe conditions of shock and vibration — on ships, submarines, airplanes, trucks, trailers, and rail cars. Typical applications include: technical data analysis, range instrumentation, real-time guidance, tactical control, and other applications where rugged construction and high computational ability are required. Designed for processing large quantities of complex data, the Univac 1206 employs random access storage of information. Average execution time for an instruction is 14 microseconds.

18

SEPTEMBER 1960—Target Intercept Computer designed and developed by Univac for Nike Zeus anti-missile missile

Univac, working in close cooperation with Bell Telephone Laboratories, has developed a military high-speed, high-reliability computer for guidance of the Army's Nike Zeus anti-ICBM missile.

Speed, accuracy, and reliability are key factors in this system. Speed because once a target missile is detected, only minutes remain in which to intercept and destroy it. Accuracy because the Univac computer must fix launching time, project exact intercept time and place, and send steering orders to guide the Nike Zeus to its target. Reliability because the Univac computer must continue to adjust its computations up to the last moment of guidance, when the target missile is destroyed.

19

5 major developments in systems

6 major developments in peripheral equipment

4 major developments in tabulating equipment

5 major developments in computer engineering and facilities

FROM UNIVAC

DIVISION OF SPERRY RAND CORPORATION

... and more to come in '61!

(continued from page 21)

A data processing system may expedite trial of the "big case"

Data processing systems may provide an opportunity for expediting the trial of the notorious big case that has been clogging the dockets of many federal district courts and regulatory agencies in recent years. One contribution would be the reduction of the time required by counsel to try their cases by facilitating behind-the-scenes preparation, a major cause of delay. Equally significantly, it might also present an opportunity to reduce the burden on the court or hearing examiner and the time required by them to analyze the evidence and arrive at a decision. The judicial burden in this regard is an immense one. While opposing counsel generally have teams of lawyers and various auxiliary personnel at their disposal, the court is fortunate if it has an experienced law clerk to aid it, and the trial examiner generally has no assistance whatsoever. Any help provided in that direction would be most welcome by the bar as well as by the courts and other tribunals.

Pursuing a suggestion that counsel provide the court with a bare index to the evidence, a standard set of cards could be prepared for all counsel and the tribunal. These cards would at least identify each witness or exhibit without more detail. From such a complete set of punched cards, the tribunal could achieve the same advantage of ease of record analysis as would the litigants, thus permitting a prompter decision. If an index system devoid of suggestions of trial strategy could be agreed upon between counsel and the tribunal, each item could be classified in accordance with it on the basic cards distributed among them, and such cards would be more helpful to the tribunal.

Possessing a series of punched cards for all of the evidence, assuming that the necessary card punch and sorter and their operators would also be provided, the trier could put on the cards, as the evidence is introduced, his observations on its respective significance. Of course, this would have to be done pursuant to the same orderly system as described in this article. However, the court could easily adopt as its classification of the evidence the issues as developed in pretrial conferences.

Conclusion

The big case in the fields of antitrust, tax, patent, minority stockholder, rate, and license suits seems to possess the ideal ingredients for the efficient use of machines for processing the voluminous accumulations of evidence. Greater professional competence will result from the speed and accuracy with which the evidence can be analyzed and assembled categorically. Cost economies can be passed on to the clients, thus minimizing a chronic source of dissatisfaction with resort to litigation.

Benefits of considerably broader significance might be achieved if such a system could be utilized simultaneously by the tribunals upon whom the greatest burden falls in major litigation. Experience gained with such a system in the relatively limited area of litigation evidence might remove the barriers to adopting it for legal research in the case reports.

The enterprising lawyer should explore without further delay the possibility of harnessing for his assistance some of the technological wizardry of our exciting era. ■

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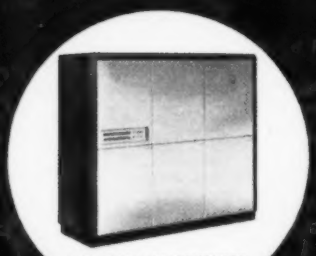
CONSULTANTS TO INDUSTRY COURSE

A five day course in wage and salary administration was held in New York City May 15-19. This was presented by Consultants to Industry, Inc., in cooperation with the School of Banking of the New York State Bankers Association.

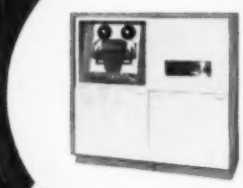
Each of the areas of wage and salary administration was analyzed intensively, stressing the practical applications of theory and present practice. The areas covered were: job description, specifications, evaluation, employee appraisal, merit rating, and employee benefits and services. The effect of electronic data processing in the above areas was also discussed in sessions including work shops, discussion groups, and lectures.

The course was prepared by Professors Lovejoy, Shaffer, Trotta, and Waite, of the staff of Consultants to Industry, Inc. Assisting in the presentation of the course were Theodore H. Fischer, assistant personnel director, Chemical Bank New York Trust Company; Richard VanDyke, Chase Manhattan Bank; Harry Gershenson, senior associate, George B. Buck; and Winston S. Fleiss, vice president, Johnson and Higgins.

YOU CAN SPREAD A COMPUTER ALL OVER THE MAP!



2400 SATELLITE COMPUTER



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NOW . . . company-wide data processing integrated into one efficient system. A Philco 2000 electronic data processing system at headquarters is tied through a Philco Data Link system, using Philco Microwave or leased lines, to remote Philco input-output systems. Data from remote stations as well as local computer inputs are coordinated and pre-processed by a Philco 2400 Data Handling System to produce new heights of computer efficiency.

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Inputs: any combination of data link and local inputs.

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HOW TO . . .

Write Effective Machine Room Procedures

USABLE MACHINE PROCEDURES can be developed in your punched card installation with less effort than you may have imagined. Eloquent style is not a requirement of procedure writing. Any individual possessing a sound knowledge of punched card principles can write excellent machine room procedures by merely following a few simple rules.

Why use procedures

Before we discuss the *how* of procedure development, perhaps we should elaborate on the need for punched card procedures. Certainly some small installations with limited applications and a low personnel turnover rate can get along without formal procedures. Most data processing departments, however, face increased demands for more complex reports and more applications. Also, the skill of the average machine operator has declined in recent years because of the tremendous growth of this occupation. There simply are not enough good operators to go around. Thus, procedureless installations are vulnerable to serious troubles.

Some of the advantages of procedure use:

1. Facilitates operator training: we need no longer wait for an operator to memorize the machine processes over a period of several months. The training period is reduced to the time necessary to instruct the operator in using procedures, provided he has some basic knowledge of the equipment.
2. Permits greater operator flexibility — work can be rotated among the operators. The reliance upon one operator to perform certain tasks can be abandoned. This will prove particularly beneficial during periods of vacation, illness, or high turnover rate.
3. Minimizes machine room errors. Adherence to standard machine room procedures contributes greatly toward accurate work. This usually provides more machine time, because errors invariably result in additional machine processing.

Rules for procedure development

A basic set of rules such as these can improve your punched card operation:

1. Select a simple standard form to be used for all data processing procedures.
2. If flow charts are used, decide upon standard symbols. Use them consistently. A universally accepted group of symbols is illustrated in *Figure 1*.
3. Be consistent in terminology. This speeds learning for machine operators, and facilitates communication.
4. Identify all documents. Explain — by text or picture — where they came from, what they look like, and where they are going.
5. Thoroughly describe each operation. Be as brief as possible, but do not sacrifice complete understanding for the sake of brevity.
6. Provide comprehensive machine information.

By R. A. Nelson

This is a rather large area and can be further expanded upon as follows:

a) Indicate the type of machine to be used.
b) Identify all machine set-up conditions, such as position of set-up change switches, hammerlocks, card count devices, etc.
c) Specify card feeds to be used if more than one is available.
d) Denote type, size, and ply paper to be used. Specify special carriage tapes, if necessary.
e) If a permanent wiring panel is to be used, assign a number to it and always refer to it by name and number. If the panel must be wired specifically for the operation, include either a wiring diagram or a spec sheet to assist the operator and also to keep board wiring time to a minimum.
f) Include a sample of each report in the procedure and a test deck for producing the sample report. Before processing the actual work, always run the test deck and completely check the results against the sample to assure proper job set-up and to test machine performance. In creating the test deck, be sure to simulate all possible conditions, such as x-selection, digit selection, etc.

7. Identify all control and balancing routines. If the processing is to be stopped because of an out of balance condition, unmatched cards, etc., be sure to indicate this.

To illustrate the rules set forth, a representative payroll procedure is shown in *Figure 2*. Note that after each step, complete instructions for the disposition of documents used in that step have been provided.

Up-dating the procedures

While the major task in obtaining machine room procedures is the original effort, a program must be initiated to preclude obsolescence of procedures. This can be accomplished by scheduling specific review dates for all procedures used. Normally, this responsibility should be assigned to one person: either the punched card supervisor, or a punched card methods analyst on your staff or from a management consulting firm. Also, a master set of procedures should be maintained; no changes should be made to working sets, unless the master set has been changed first. This can be controlled by issuing corrected working copies from photocopies of the corrected original.

Finally, procedure changes due to newly developed techniques or new equipment announcements should be pursued without regard to the procedure review schedule whenever such information becomes available. ■

STANDARD FLOW CHART SYMBOLS

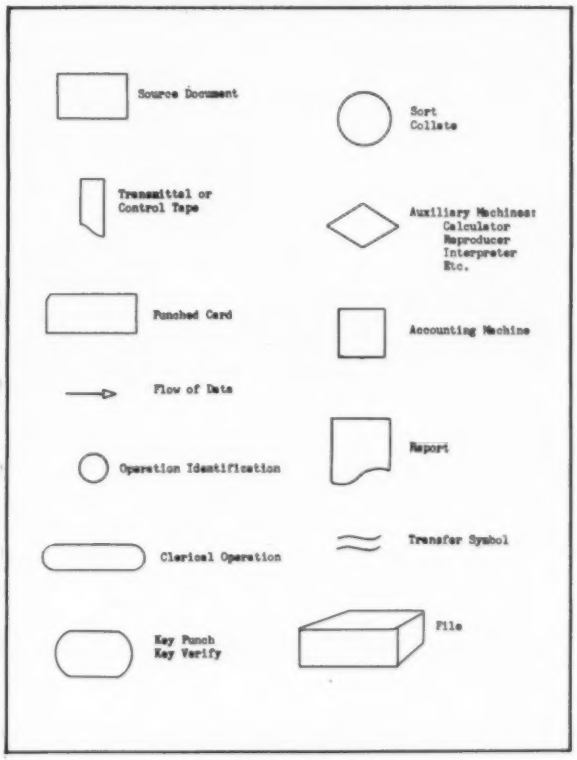

FIGURE 1

APPLICATION WRITEUP — PROCEDURE CHART

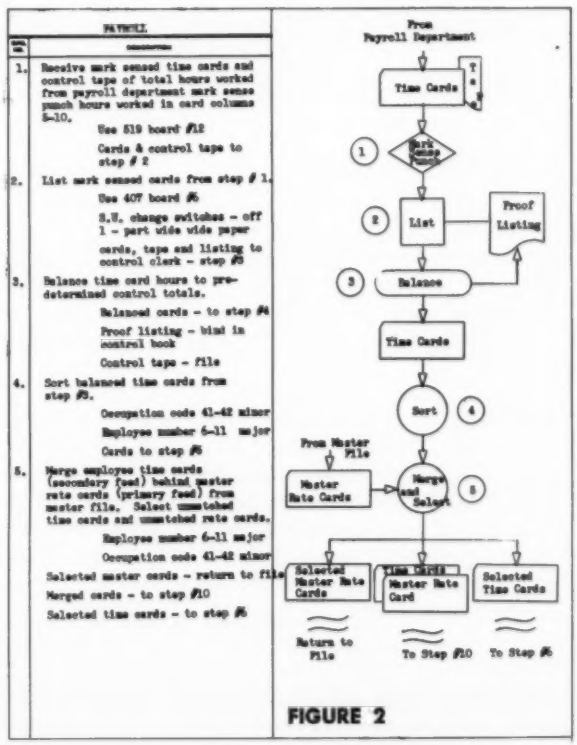
PAYROLL
1. Receive mark sensed time cards and control tape of total hours worked from payroll department mark sense punch hours worked in card columns 5-10.
Use 519 board #12
Cards & control tape to step # 2
2. List mark sensed cards from step # 1.
Use 407 board #6
S.S. change switches - off
1 - part wide wide paper
cards, tape and listing to control clerk - step #3
3. Balance time card hours to predetermined control totals.
Balanced cards - to step #4
Proof listing - bind in control book
Control tape - file
4. Sort balanced time cards from step #3.
Occupation code 41-42 minor
Employee number 6-11 major
Cards to step #5
5. Merge employee time cards (secondary feed) behind master rate cards (primary feed) from master file. Select unmatched time cards and unmatched rate cards.
Employee number 6-11 major
Occupation code 41-42 minor
Selected master cards - return to file
Merged cards - to step #10
Selected time cards - to step #6
From Payroll Department
Time Cards
Mark Sense Punch
List
Proof Listing
Balance
Time Cards
Sort
From Master File
Master Rate Cards
Merge and Select
Selected Master Rate Cards
Time Cards
Master Rate Card
Selected Time Cards
Return to File
To Step #10
To Step #6

FIGURE 2

"*National*® 304 Data Processing System has proved to be a highly profitable investment!"

—S. C. JOHNSON & SON, INC., *Racine, Wisconsin*

"The National 304 enables us to know *today* where we are *today*. For example, we can now bill customers on the same day items are shipped from warehouses anywhere in the United States. This has enabled us to pick up working capital equivalent to three days' sales—an important saving.

"We can now take action *today* on inventory requirements based on last night's actual inventory and unfilled orders position. As an initial result, we have reduced finished inventories by 10%, with the potential of greater reductions in the near future.

"Our manufacturing and production scheduling are now more closely coordinated with sales needs than ever before. And, our field warehouses are stocked more intelligently, enabling us to serve our customers better.

"Fundamentally, the National 304 has given us faster and more accurate control over sales efforts, production, inventory, credit, and customer billing. It has sharpened management reflexes, enabled us to harness data in time to be used most profitably, and meets our demands for the factual data necessary to make management decisions in time to be most effective.

"At this stage of our installation progress it is difficult to assign a definite money value to all these advantages. However, we know their value represents a highly profitable return on our investment."

Howard M. Packard

President
S. C. Johnson & Son, Inc.

"Leading manufacturer of wax polishes and other fine products for home, industry and agriculture."

THE NATIONAL CASH REGISTER COMPANY, Dayton 9, Ohio

1039 OFFICES IN 121 COUNTRIES • 77 YEARS OF HELPING BUSINESS SAVE MONEY

* TRADEMARK REG. U.S. PAT. OFF.

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The Scope of Management Analysis

Constant analysis necessary for effective management.

A GROWING BUSINESS requires an increasingly complex management structure and complementary methods for maintaining management effectiveness. How may these aims be accomplished? The answer can be found in a specialized function which may be termed "management analysis."

Need for management analysis

Management analysis is the act of measuring management effectiveness and of designing measures to maintain effective planning, coordination and control. As a company grows in size, these functions become more difficult for top management to perform and less time is available for maintaining their effectiveness. Management people eventually find themselves losing a grip on their business unless they make an effort to have these three organization functions continuously studied and appraised. The eventual situation is that study of these functions must be delegated to a group of specialists who themselves are not involved in the direct responsibilities of operating the business. These people may be referred to as *management analysts.*

In a smaller company the existence of the management analysis function may not be readily apparent because in such operations the individual entrepreneur has an intimate knowledge and control of operating conditions. His business is usually expanding at a rate which is conducive to his abilities and with which he is quite satisfied. Through experience the entrepreneur has become capable of weighing the importance of variables in adjusting to business conditions and therefore is unconsciously performing the management analysis function even though not in a most scientific manner. Trial and error without scientific analysis is the drive that characterizes the small operator.

The conditions facing big business, of course, have more far reaching effects than to allow company policies to be developed through trial and error. Larger firms are more inflexible in adjusting to business conditions, therefore their planning and forecasting period extends into the long term rather than the short term. Policies must be developed with a more exacting knowledge of what the firm is capable of producing and what the market

By G. Edward Bissell

may be expected to absorb. This requires more concentrated management planning and less time is available for direct operational supervision. Management, however, is still not relieved of coordinating and controlling functions, but must perform these as efficiently as ever with less available time. As busines expands, management is required to develop limits in which operating authority may be delegated yet business conditions still can be intimately relayed to managers.

Small versus large enterprise

Small concerns are very flexible to variations in business; production readily may be expanded or contracted in reaction to changing markets. Further, management talents may be otherwise employed during production lulls or setbacks. Large concerns, however, are more rigid in varying their factors of production. The large firm's capital structure is planned for long term development. Sudden unanticipated variations in market conditions leave the firm with virtually no financing for new product research or production expansion in the short term period. Additionally, the large firm experiences difficulties in securing bulk sources of raw material and in developing management talents in the short term.

Large firms have additional responsibilities in respect to the effects upon community economic life which result from variations in their production. Considerable non-tangible losses may be experienced by inadvertent variations in short term production plans. Production and expansion planning which comprises plant building and relocation, employee displacement and retaining, market research and development, and product development, must therefore be considered in the long term period, in contrast to the short term development planning of the small firm.

Management in the large firm is concerned with a great complexity of business variables wherein the planning aspects are considered in the long term period, and the coordination and controlling functions remain a short term consideration. In contrast, the planning, coordinating and controlling functions of the small firm are of such inconsequential significance as to be entirely short term considerations, and entirely within the grasp of an individual proprietor. In the larger firm then, as management becomes more concerned with the long term planning aspects, it is necessary to delegate the coordinating and controlling functions but within a reasonable span of control. This then entails setting up reasonable operating limits for the delegated officers and subsequently measuring the performance of their duties.

Effective management may therefore depend upon the efficiency with which the planning, coordination and control functions are performed and the flexibility with which these factors may respond to changing business conditions. The prerequisites to knowledge and resulting action to changing business variables are effective communication, management flexibility and real time business system application.

Organization for management analysis

In order to maintain effective control and be flexible to changing business conditions, there must exist a good basic effective control system. A prerequisite to organizing a management analyst group is the existence of an adequate real time management control system. The system need not be the most efficient because the management analysts will be responsible for increasing its efficiency and effectiveness. There must, however, exist a basic desire and support of management to operate such a system, and the basic elements for gathering pertinent operating data and for effecting decisions.

The analysts group must have the support of and report to top management, otherwise the project will flounder at the mercy of dominant personalities at the middle management level. The group should consist of a composite background of experience and education and be capable of assessing the short term effects of long term plans and policies, and be further conversant with the pertinent operating decisions in the short term period. Having the capability to separate the wheat from the chaff, they are capable of assessing management effectiveness and offering suggestions for improving the coordination and control of a business.

The management analysts should also be continually abreast with current management techniques and with developing automation technologies. Above all, these specialists must serve management on a continuous basis. Otherwise optimum designed policies will soon become redundant and, unless redesigned so as to cater to real time business conditions, may contribute negative returns to the effectiveness of management control.

In summary it may be said that an expanding business should be aware of the chaos which could develop should there be reluctance to analyze the effectiveness of management administration, and hesitation to delegate an analysis function of administration. Even in a small business the individual entrepreneurs should not underestimate the dynamic elements which require an extremely flexible business manager and which, unless compensated for, may not allow the business to expand at an optimum rate, and which may even result in a small business bankruptcy. Management analysis in scope, therefore, may be adaptable to the small as well as the large firm. ■

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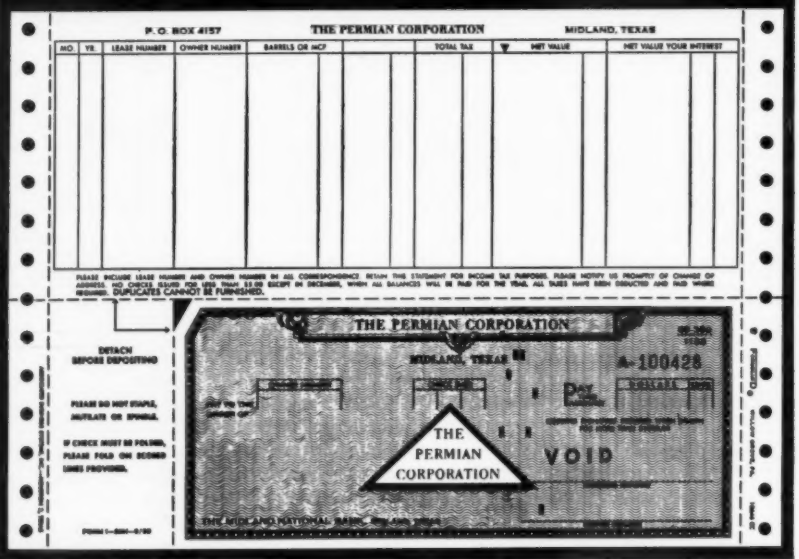

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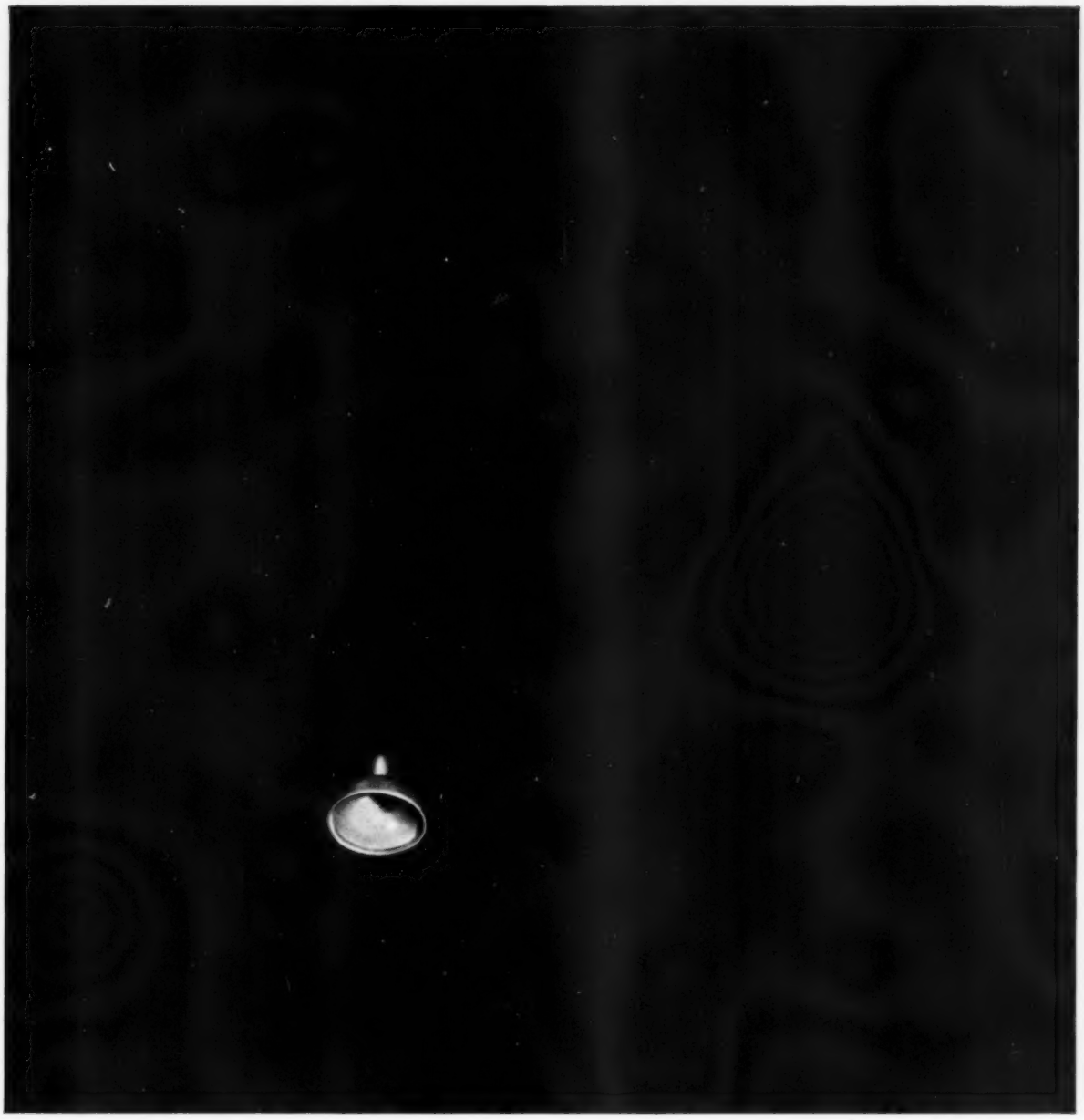

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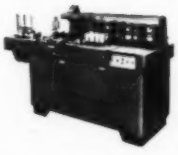

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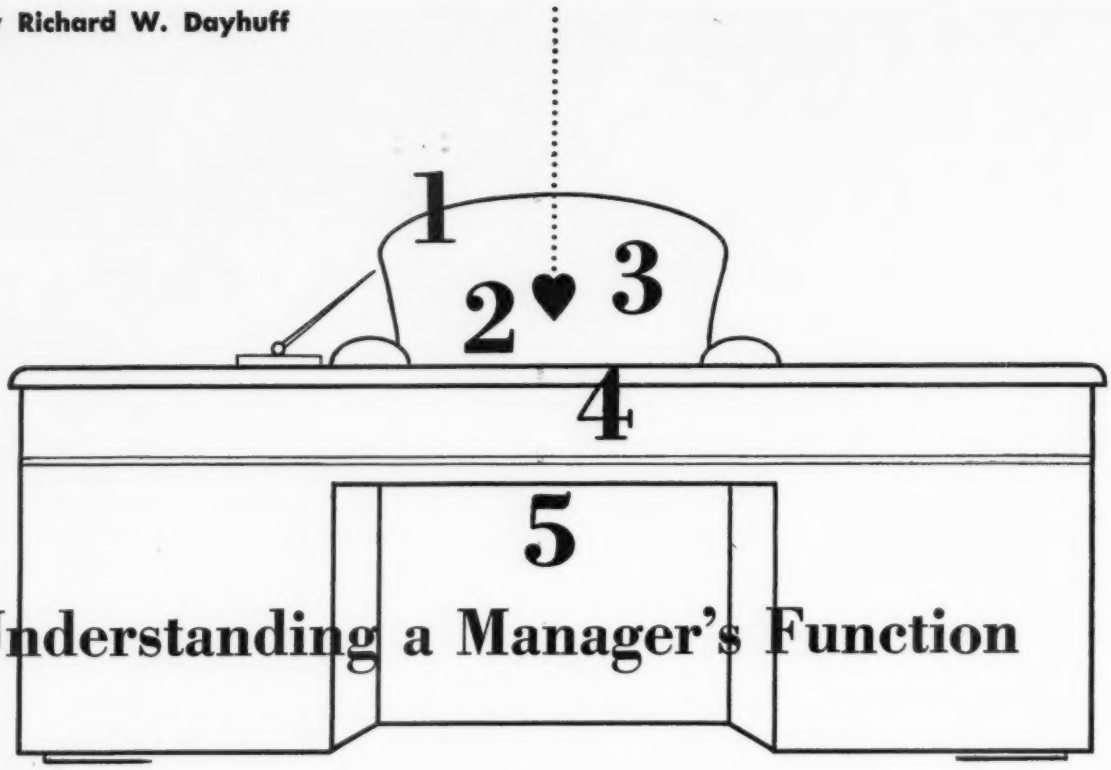
By Richard W. Dayhuff



Understanding a Manager's Function

IF YOU WANT PROMOTION TO MANAGERIAL STATUS, it is a fact that you will have to understand the functions of a manager, and demonstrate this understanding, before you are liable to be selected. The following five principles of data processing management are offered as an aid to understanding:

1. The principle of essential work

A good manager is one who does only that which he alone can do. If you are a machine supervisor, methods analyst, or other subordinate working for a manager whose position is between your level and the policy level of the company, and you feel that you are doing all the work and getting none of the credit, think back and see if the controller or the "vice president in charge of" has come down and pounded on your desk recently. Your manager, in most organizations, is the one who gets the blame while his employees are fixing their most recent blooper. The manager should not do any work himself that the employees are capable of doing, barring unusual situations which may require his attention. However, certain work cannot be assigned. Examples are reports to higher management, assignment of salary levels, and correspondence to other department heads. In essence, the manager sees to it that the work is done, applying his personal attention only to trouble areas.

2. The principle of responsibility

The words "responsible for" are often used to describe a manager's job. He is responsible for: the work being done on time, though he does not actually do it; the proper level of supplies inventory though he often does not order them; the design of new systems though he frequently has a specialist under him who does this work; selling an idea to management, which often he alone has the personality, the drive, and knowledge of company policy to do; the morale of the employees, even if he must deal with them through the supervisor, whose actions can be the direct cause of good or bad employee relations.

3. The principle of approval

Be aware that the man with general responsibilities as a manager is wasting his time doing the actual work. His is an "approval" job. Any subordinates worth their salt will make suggestions and plans for their manager to approve. They will not put a plan or procedure into operation without prior approval. They will back him up on his policies whether they agree with them or not, once the policies have been adequately discussed.

A good manager will usually have frequent planning meetings where such discussions are expected.

The manager knows what general plans he can get approved by the higher management. The supervisor is seldom so acquainted with the personalities of the top men. This principle of approval is extremely important for two specific reasons beyond the general reason of good procedure. They are:

a. Approval requires detailed justification of a suggestion or plan, if the results are not obviously beneficial. When a subordinate knows his plan is going to be picked apart he will do everything possible to make the original suggestion complete to the finest detail. This does not obviate planning meetings, rough drafts and preliminary proposals. Indeed, such procedures are required for adequate planning.

b. By obtaining approval, the subordinate is protected against major mistakes. The manager is then responsible for the entire plan. It is a sign of good management for a machine supervisor to get protection from criticism from higher authority with a memorandum stating the manager's approval of a plan.

4. The principle of planning

Machine supervisors are notorious for having little time for any but the day-to-day activities of their busy profession. Adequate long range planning is difficult enough without the constant interruptions to which a supervisor is subject. The manager's job of planning is one of the most important things he does. It is generally recognized that planning data processing on a company-wide basis requires attention which precludes assigning daily jobs to the planning coordinator (manager). A multitude of meetings, discussions, exhortations, changes of policy, definitions of responsibilities, and just plain salesmanship are necessary to put new applications on machines. The manager normally has no time to follow all the details of his installation and the production of scheduled work. At the same time, the supervisor has no time for the maneuvering done in the administration when conflicts develop between heads of departments over responsibilities and work assignments. These conflicts often require full-time tactical efforts by the manager. If the supervisor has to do it, the days he spends in meetings are days lost for his installation.

5. The principle of protection

Frequently, a supervisor may misunderstand this principle. It may appear that the manager is trying to steal all the glory when he limits the supervisor from direct contact with other departments. In reality, this limitation is good protection. The manager is entirely responsible for his department. For this reason, he must control all the actions of his employees. He must also receive complaints against them and take or refrain from action based on his judgment. If the supervisor makes a mistake stemming from action he did not have approved, he can expect to be criticized. It is hard for people not experienced in dealings with corporate officers to imagine the impact of criticism for any event in his department. A wise supervisor takes advantage of the protection offered by this principle, and does not lay his head on the block by trying to step into the manager's shoes. Higher management could view with suspicion a man who attempts to demand recognition by trying to demonstrate without authority how he can take over a manager's functions. He may become an object of distrust to them, or worse, an object of ridicule, because if the fellow will step around his present boss, he may be counted upon to continue this course if he is promoted.

What course of conduct should you follow? Be loyal, support your immediate superior. If you disagree, do it privately. If you are overruled, accept it with a grin. This demonstration of loyal support will help show how you understand the basics of management, particularly these few principles. ■

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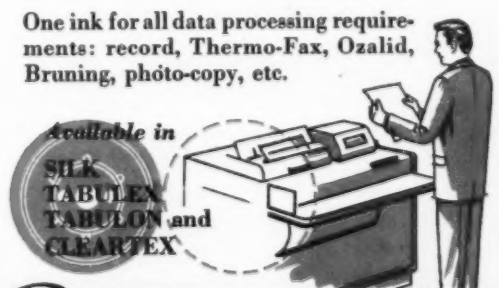

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By Edith Harwith Goodman

Legal Aspects of MICR Program

Bankers Conference covers many phases of MICR conversion.

LAWYERS are not the only ones concerned with the law as it relates to electronic data processing. Bankers are looking into what MICR (magnetic ink character recognition) encoding and machine processing will mean to their operations. The *Legal Aspects of the MICR Program* was a new note in the topics discussed at the Second National Conference on Banking Automation held in May, 1961, sponsored by the Detroit Research Institute.

James V. Vergari, vice president of the Federal Reserve Bank of Philadelphia, explored the problem for the nearly two hundred assembled bankers. He noted that most of the problems in this field existed before bankers adopted MICR and installed electronic data processing, although the newer methods have created some new problems of liability between payor bank and drawee customer in checking, especially in banks where visual verification is at a minimum. However, spot checking an established percentage of processed checks should do much to catch errors.

The problems arising from use of MICR and machine processing, according to Mr. Vergari, are:

The responsibility between payor bank and customer drawer on misprinted, lost, or stolen coded checks will depend primarily on who was most negligent. That is, if a customer furnishes his own imprinted checks and they are lost or stolen he would be negligent if he did not immediately report such a loss to the bank. On the other hand, if a bank makes a mistake in encoding amount numbers and overdraws a customer's account, it would be liable, particularly when verification was not done to see that the encoded amount and written amount tallied.

Audit controls are needed during the posting process to ensure that posting is done to the proper account numbers.

Encoding amounts on checks for MICR processing does not constitute "alteration" of a negotiable instrument.

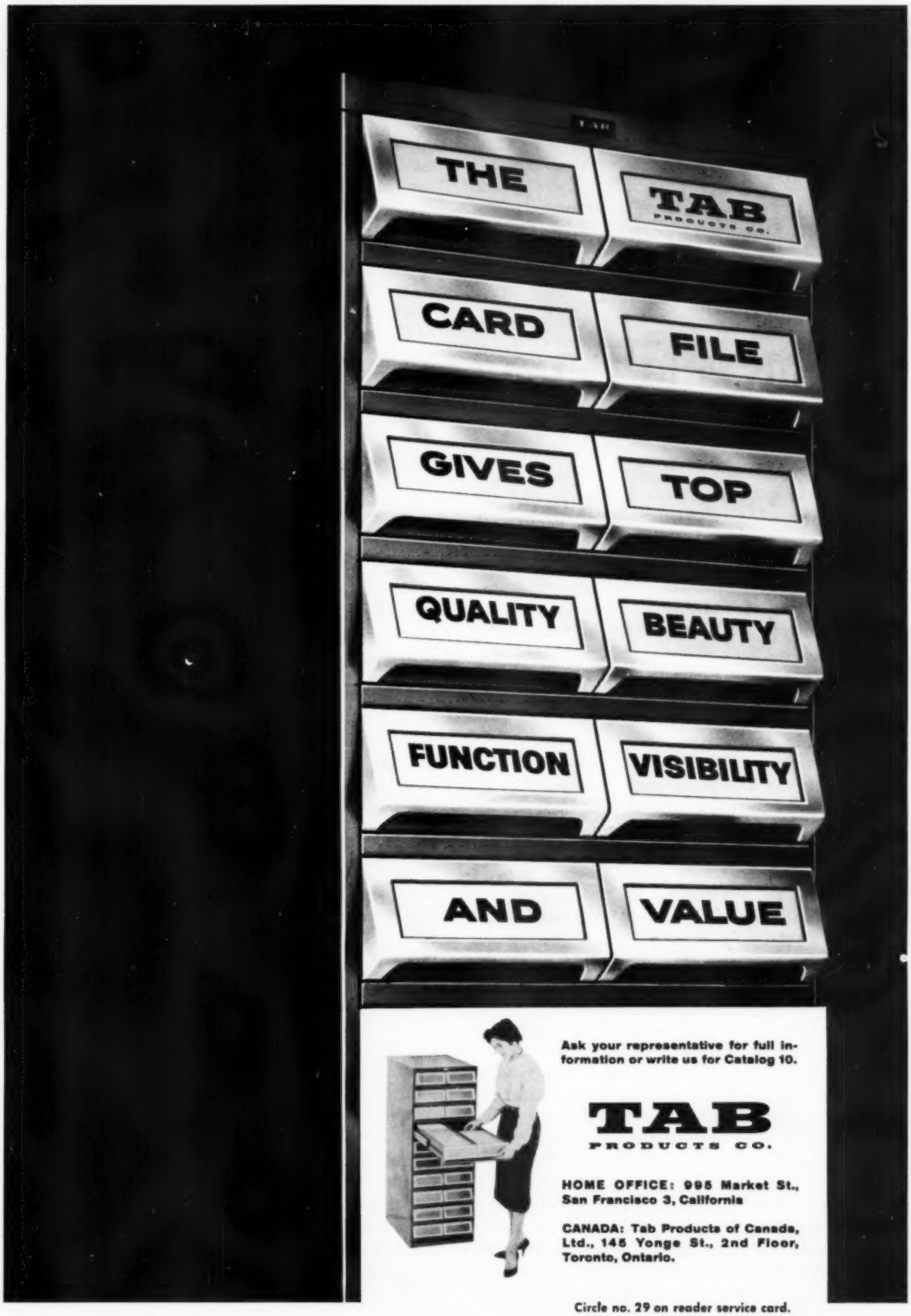
The payor bank is liable to the drawer of the check for paying out the proper amounts since it has the responsibility and authority to charge only the amount written by the drawer customer on a check. It is liable for the difference if it mistakenly overpays on a check, and can hope that the customer does not hold it liable for "special damages" if following checks are not honored, or if the overencoded check is more than the balance and consequently is not honored.

The payor bank would have a legal right to recover the amount of overpayment from a depositary bank which had encoded the check (as the first to handle it), even though the latter had remitted the proceeds, if the collecting bank were more at fault than the drawee in connection with the overpayment.

An intermediate collecting bank might disclaim responsibility for accuracy of any encoding, or stipulate that it takes practical precautions and warns that the payor bank is depending on the encoding at its own risk. If the payor bank, fully mechanized, uses the encoded amount under these conditions for its accounting, it should be held to do so on its own responsibility. This is true if no controls are used in a totally mechanized system, and less apt to be true of a partially mechanized bank that still uses visual verification.

There is little difference in the legal aspects of the newer system in using mechanized accounting as evidence; mechanization is simply a tool. A long range educational program is needed to dispel fears of mechanization of bank accounting.

Besides the legal aspects of the MICR program, other topics at the conference covered: the present status of bank automation, electronic data processing as a banking management information tool, designing today's system to meet tomorrow's needs, how to implement a computer program for a bank, problems of conversion, profitability planning in bank automation program, contractual banking automation. There were special session discussions on theories of demand deposit computer processing, audit control over computer processing, what smaller banks can do to prepare for automation, feasibility studies, equipment selection studies, encoding problems, automatic transit operation, branch banking problems, installment loan accounting, document sorting, and the human element in automation. ■



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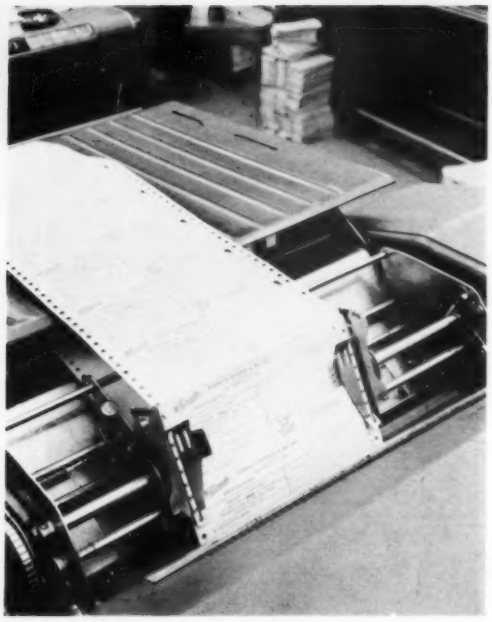
APPLICATION OF THE MONTH

Candy and Calendars



Forms smooth distribution of promotional material.

FROM MODEST BEGINNINGS IN 1842, when Stephen F. Whitman first opened a small Philadelphia confectionery shoppe on Market Street, Stephen F. Whitman & Son, Inc. is today recognized as the largest manufacturer of packaged candies in the world, has made the "Whitman Sampler" a household word.

In a highly competitive industry, Whitman's pioneered production equipment and systems, established rigid laboratory and manufacturing quality controls and inaugurated new methods in manufacturing and operations to reduce costs by various programs of automation, at the same time employing an aggressive sales and marketing program to achieve distribution of the company's products through more than 23,000 retail outlets including drug, chain and department stores. Manufacturing approximately 50 different assortments of candy — ranging from the Sampler at $2.00 a pound to Mint Patties at 5¢ each — the firm is also the oldest and largest advertiser of candy in the world. Long a great believer in point of sale material, the company is constantly supplying retail outlets with promotional material of all kinds, putting a heavy accent on dealer aids. (Whitman's in 1907 established a national sales organization, thus deals directly with retail outlets.)

Typical of previous steps in the direction of improved efficiency by revising or eliminating error-prone manual operations is the firm's introduction (1959) of pre-punched Formscards into an annual sales promotion operation that delivers 3,500,000 souvenir pocket calendars to Whitman retail outlets for point-of-sales distribution by dealers to customers.

Promotional calendars

In a many-year-old practice, Whitman's had arranged printing of the promotional pocket calendars (imprinted with name, address and telephone number of the retail outlet) and sold them to dealers at nominal cost to cover imprinting and handling. They found that rising manual processing costs for handling were making this promotional "accommodation" service more and more expensive, but at the same time were reluctant to discontinue the practice. An added burden: the once-a-year processing of orders, printing and invoicing for the pocket calendars unfortunately had to be concentrated in the peak-load month of November, when facilities and staff were already critically taxed with Christmas season invoicing.

Under the old system, each salesman was furnished a conventional order pad for the calendars, with a three part order form. He would approach interested dealers, write up an order on the premises of a retail outlet and forward the original and carbon on each order to company headquarters for filling. The original order form was sent to the printer for printing and shipping directly to the customer. The carbon was kept as Whitman's office copy. The printer retained the original order form, duplicated it, and returned to Whitman's a sheet invoice for each individual order.

From these invoices the name and address cards

were pulled from the billing file. Into these cards were collated item cards, prepunched by quantity for each particular group. What could not be collated in that manner had to be keypunched and go through a normal billing routine which involved several machines. It was a manual operation that produced errors: a thousand calendar order would accidentally slip into the two thousand calendar order pile and the mistake would require reprocessing.

New procedure

Last November, for the second year, Whitman's again sent out approximately 20,000 Formscards as original order forms for pocket calendars to its sales force. This took only 25 percent of the processing time previously needed to get to the point of running an invoice, saving 88 percent in labor costs on the operation. (Four hours currently versus 16 hours previously, $12 now versus $100 in labor formerly.)

Using the master file of customer name and address cards, the first step is to print the cards on the 407 in sequence alphabetically, within states, by salesman's territory. (Printed, the Formscards are trimmed mechanically on a power deleaver with knives set to break, rather than cut, the perforations, and are then burst in sequence.)

Reproducing from the customer master file cards on the 519, the customer account number (for identification) and salesman's territory are reproduced into the Formscards. (At the same time, an additional set of name and address cards which are held in abeyance are prepared.)

Next step is to pad the Formscards into books by salesman's territory, using Mystic adhesive tape, manually applied to a stack of the Formscards and bound to top and bottom pad covers. (This is a unique padding technique developed by Whitman which permits the Formscard itself to act as the individual order form that already bears the dealer's name and address as printed by the 407, contains spaces for dealer's and salesman's signature, box checkoff for quantity — 1,000, 2,000 or 3,000 calendars ordered, plus space for imprint desired on pocket calendar. It is a one-part, no carbon form.)

The order books are shipped to salesmen who use the appropriate Formscard with dealer's name when filling out the order; they forward the Formscard to Bala-Cynwyd headquarters. (For new customers, salesmen are provided with pad of blanks.)

Received at headquarters, each Formscard has quantity of calendars ordered keypunched in. From this an item card on the 519 is made; the account number, the quantity and the territory are reproduced and the unit price and item description are gang-punched, thus making up the billing file.

The previously-prepared name and address card is pulled and sent with the Formscard to the printer. With printing of the calendars completed, the printer uses the Formscard, runs a listing which shows quantity and customer account number and returns the name and address cards to Whitman's, retains and files original Formscard order form. (Whitman's can thus now refer all inquiries about calendar order errors directly to the printer for adjustment, with the original Formscard order form immediately available to the printer for inspection. Eliminated is previous Whitman researching of files to dig out house copies of orders.)

The returned name and address cards are used by Whitman's to match against their item file on the 077 collator and invoices are run. For those states having sales tax, a sales tax card is prepared by sorting down on quantity and injecting a card in.

The biggest saving is in the time saved in preparing and getting invoices into the dealer's hands early, an operation that now is timewise less than a day as opposed to the previous operation which extended over a couple of weeks because manual operations had to be fit into a busy November schedule. ■

Coming Events

JULY 16 - 22

ISA and IRE 4th International Conference on Bio-Medical Electronics and 14th Conference on Electronic Techniques in Medicine and Biology.
Waldorf-Astoria Hotel, New York, N. Y.
Contact: Dr. R. L. Bowman, ISA, Dept. of Health, Education and Welfare, National Institutes of Health, Bethesda 14, Md. or Dr. Herman P. Schwan, IRE, Univ. of Pa. School of Elect. Eng., Philadelphia, Pa.

JULY 18 - 20

Western Plant Maintenance and Engineering Show and Conference.
Pan Pacific Auditorium, Los Angeles, Calif.
Contact: R. L. Saling, Ch. Bd. of Sponsors, c/o Clapp & Poliak, 759 Monadnock Bldg., San Francisco 5, Calif.

AUG. 10 - 12

Bendix G-15 and G-20 Users Exchange Conference.
Denver Hilton, Denver, Colo.
Contact: Mary Jane McPhee, Bendix Computer Division, The Bendix Corporation, Los Angeles 45, Calif.

AUG. 22 - 25

WESCON, Western Electronic Show and Convention. IRE/7th Region and Western Electronic Manufacturers Association.
Cow Palace, San Francisco, Calif.
Contact: E. W. Herold, c/o WESCON, No. California Office, 701 Welch Rd., Palo Alto, Calif.

(continued on next page)

(Continued from preceding page)

AUG. 22 - 25

Career Center sponsored by Careers Inc.
Bayside Motel, 2011 Bayshore Blvd., San Francisco, Calif.

AUG. 23 - 26

Institute of Management Sciences, 8th International Meeting.
Palais de Congres, Brussels, Belgium.
Contact: I. M. C., Box 273, Pleasantville, N. Y.

AUG. 28 - 30

American Accounting Association Convention.
Austin, Texas.

SEPT. 5 - 8

Association for Computing Machinery, 16th National Conference and 1st International Data Processing Exhibition.
Statler Hilton Hotel, Los Angeles, Calif.
Contact: Ben F. Handy, Jr., General Chairman, Litton Systems, 5500 Canoga Ave., Woodland Hills, Calif.

SEPT. 6 - 8

IRE International Symposium on Transmission and Processing of Information.
Massachusetts Institute of Technology, Cambridge, Mass.
Contact: Peter Elias, MIT, Room 26-347, Cambridge 39, Mass.

SEPT. 11 - 15

Fall Instrumentation-Automation Conference, ISA 16th Annual Meeting and Exhibit.
The Biltmore Hotel and Memorial Sports Arena, Los Angeles, Calif.
Contact: Wm. H. Kushnick, Exec. Dir., ISA, 313 Sixth Ave., Pittsburgh 22, Pa.

SEPT. 11 - 15

SHARE Computer User's Conference, IBM 701, 704, 709 and 7090.
Washington, D. C.
Contact: Mr. S. S. Closman, IBM Data Processing Div., 112 E. Post Rd., White Plains, N. Y.

SEPT. 18 - 23

Electronic Representative Association, Business Management Institute.
University of Illinois Campus, Champaign, Ill.

SEPT. 19

Tabulating Card Manufacturers Association General Meeting.
New York City, N. Y.
Contact: C. A. Greathouse, Exec. Sec. TCMA, 145 E. 32nd St., New York 16, N. Y.

SEPT. 20 - 21

IRE, PGIE, AIEE and ISA Industrial Electronics Symposium.
Bradford Hotel, Boston, Mass.
Contact: Ronald A. Jurgen, Sutton Publishing Co., 172 So. Broadway, White Plains, N. Y.

SEPT. 25 - 27

Life Office Management Association Annual Conference.
Shoreham Hotel, Washington, D. C.

SEPT. 28 - 29

American Production and Inventory Control Society 4th Annual National Conference and Exhibit.
Pick-Congress Hotel, Chicago, Ill.
Contact: APICS, 330 S. Wells St., Chicago 6, Ill.

SEEN IN PRINT

COMPUTERS TODAY, by Frank Leary, Electronics, April 28, 1961.

In part one of this omnibus article, a description of the classes of equipment and components now in use is given. General purpose digital equipment is discussed, including foreign computers. Brief discussion is included of data communications, information systems, process and industrial control systems, and joint use of digital and analog equipment.

Part two deals with today's computer technology, and covers a wide range of logical circuits, devices and techniques. In addition to a full presentation of such componentry as memory devices, a number of systems and programming techniques in advanced applications areas are presented.

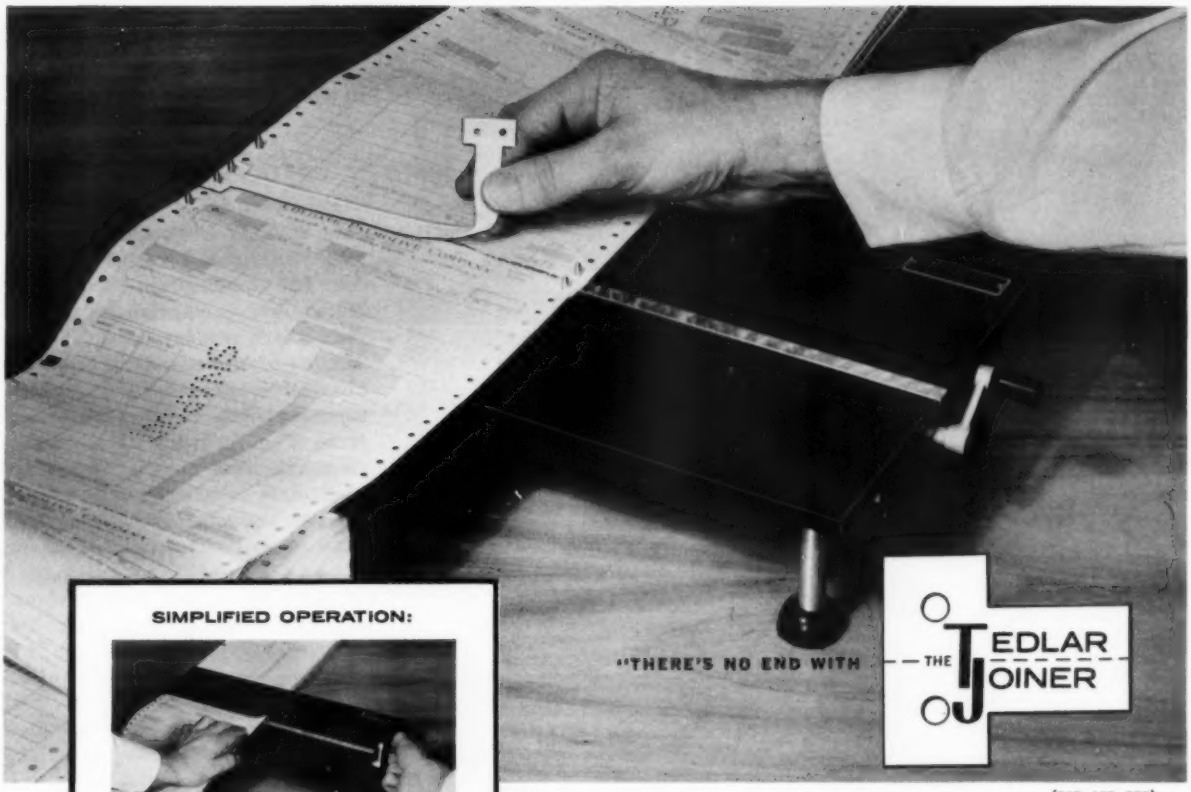
In part three, magnetic circuits, cryogenics, thin films, tunnel diodes, microminiaturization, character recognition, and associative memory and machine learning are discussed as indicators of the direction computer research is taking.

PITFALLS OF INFORMATION RETRIEVAL, by Harold S. Sharp, Industrial Research, April-May, 1961.

The equivalent of 168 encyclopedia volumes of technical information is produced daily throughout the world, and this volume should double by 1965. Despite the retrieval problems involved, it is still cheaper to do a library search than to explore a project through laboratory research, and the library search should therefore always precede other forms of research. While there are many situations in which a manual search is most practical, machine searching systems are becoming more and more necessary to cope with the volume of information often involved. The author discusses coding systems and a number of machine methods being used or developed for information retrieval.

MULTIPLE PROGRAMMING DATA PROCESSING, by B. L. Ryle, Communications of the ACM, Vol. 4, No. 2, February, 1961.

Practical aspects of maximizing time sharing by multiple programming are discussed. This imposes new design requirements, only partially found in current computer systems. The Gamma 60 has a central memory which shares operations but limits time sharing. The MH-800 has multiple memory to provide time shared input-output operations, but has limited central control. The RW-400 has both multiple memory and control but lacks intercommunication links. Ideal design requirements are discussed fully. ■



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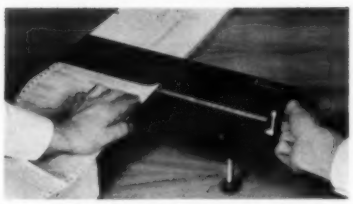
SIMPLIFIED OPERATION:



1 – Turn gear shaft handle which adjusts joiner pins to correct width of punch holes on form.

2 – Apply strip of pressure-sensitive tape (adhesive side up) to pins.

3 – Butt trail end with lead end of packs in position on pins.

4 – Seal ends with second strip of tape. (Tape is perforated down center for easy separation).

This precision instrument eliminates wasteful short strips of forms! Speeds up production!

The Tedlar Joiner provides uninterrupted feeding of forms in any width up to 14⅞" for use on tab and high speed printers. It has been tested, proven and is today being used with gratifying results by leading concerns the country over. First developed for the Colgate-Palmolive Company in conjunction with the installation of a computer and high-speed printing system, it was found to greatly reduce the "down time" which occurs each time a stack of forms is exhausted. In addition, the Joiner utilizes left-over strips of forms, joining them together to make a continuous feeding stream.

ORDERS ACCEPTED ON A 10-DAY FREE TRIAL BASIS

The Tedlar Joiner is precision engineered of heavy bakelite, brass and dural. Sets on rubber cushioned legs. Measures: 16" x 8½" x 3½" high.

79.50

(F.O.B. IN U.S.A)

Circle no. 30 on reader service card.

THE TEDLAR COMPANY

P.O. BOX 426, HUNTINGTON, NEW YORK

SEVERAL CHOICE TERRITORIES AVAILABLE TO MANUFACTURERS' REPRESENTATIVES

Bell System Data-Phone

DATA-PHONE SUMMARY

Forecasts made by AT&T indicate that by 1965, 60,000 installations will have been made of the four Bell System Data-Phone models placed into production since 1958. Data-Phone units are used for transmission of business data, originated and received in punched card, paper tape, magnetic tape, or hard copy form. The following table summarizes the rated speeds, usable data media, installation and monthly charges, and complementary systems for each of the four models.

Circle no. 30 on reader service card.

NEW EQUIPMENT

DATA-PHONE SUMMARY

Model	Transmission Speed	Data Media	Complementary Systems	Approximate Installation Rate	Approximate Monthly Rental
Series 100	75 bits/second (up to 100 words per minute)	Punched paper tape	Friden Teledata RCA Low-Speed Daspan Bell #28 Teletypewriter	$25.00	$15.00 (one-way) $22.50 (two-way)
Series 200	1,200 bits/second (up to 1,600 words per minute)	Punched paper tape, magnetic tape, or punched cards	IBM Teleprocessing Teleregister RCA High-Speed Daspan Minneapolis-Honeywell High Speed Reader and Punch Tally Register High Speed Reader and Punch Digitronic Dial-O-Verter Bell Dataspeed	$50.00	$40.00
Series 400	20 characters per second (about 11 cards per minute)	Punched cards	IBM 1001 Western Electric Card Reader	$10.00 (sender) $50.00 (receiver)	$ 5.00 (sender) $50.00 receiver)
Series 600	Manual: works with machines transmitting hand-written messages	Hard copy (hand-written)	Comptometer Electrowriter	$10.00	$ 8.00

CONTROL DATA 160-A

Control Data Corporation is marketing an expanded version of their 160 desk sized computer. The new unit, called the 160-A, is also housed in an office desk, but has been given increased capacity over the 160.

Of special interest is the large core memory available in the 160-A. The basic computer includes 8,192 words of magnetic core storage, but this can be incremented to 16,384, 24,576, or 32,768 words housed in a separate cabinet.

Input and output are buffered independently from the main computer program. A program interrupt can be initiated from the console, from the termination of an input or output buffer operation, or through either of two external interrupt lines.

Ninety-one instructions may be used with the 160-A, covering both arithmetic and console operations. Addressing modes include direct, indirect, and relative. Programs written for the 160 may be run on the 160-A.

The 160-A is completely transistorized, and executes instructions at the rate of 60,000 per second. The core memory has an access time of 2.2 microseconds, and a cycle time of 6.4 microseconds. When used as a satellite computer with the Control Data 1604 large scale system, the 160-A can communicate directly with the 1604, or can do so via microwave link at a transmission rate of about a million bits per second.

The basic 160-A system, with 8,192-word memory, uses a Control Data 350 paper tape reader and a teletype paper tape punch for input and output. The 160-A also can handle a magnetic tape system, line printer, card read/punch unit, and electric typewriter. The basic system is priced at $90,000 and rents for $2,250 per month.

Circle no. 31 on reader service card.

DATASPEED

A 1,050 word per minute teletype system has been developed by American Telephone and Telegraph for use with the Bell System Data-Phone 200. Sending and receiving sets,

(continued on next page)

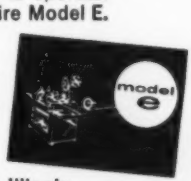
One machine to label postcards and magazines?

Yes . . . and at cost-cutting high speeds up to 16,000 per hour! The Cheshire Model E adjusts easily to handle small postcards and envelopes . . . middle-sized pamphlets and brochures . . . or even larger magazines, catalogs and quarterfold tabloids. Applies all types of labels, too (wide-strip, narrow-strip, continuous pack form, cut or individual labels) . . . whether they're pre-addressed from your punched cards, plates, stencils or other addressing systems. Compact . . . and easy to operate.

Circle no. 31 on reader service card. **The Cheshire Model E.**

CHESHIRE INCORPORATED

Write for descriptive brochure.



Dept.DP- 7, 1644 N. Honore Street, Chicago 22, Illinois

Bell System Dataspeed

using standard five-channel teletype paper tape, will be available in the latter part of this year. With this equipment, a 5,000-word teletype message can be sent from New York to Chicago in five minutes, at a long distance phone rate of $2.25.

Each Dataspeed unit is housed in a separate cabinet containing a high speed tape unwinder and rewinder. Controls are mounted on a front desk shelf. A Data-Phone 200 unit is built into the cabinet. Overall cabinet dimensions are 48 inches high, 15 inches wide, and 24 inches deep.

Circle no. 32 on reader service card.

MULTIPLIER UNIT

Those who have spent many an hour over the control panel devising ways to make an IBM 402, 403, or 419 accounting machine do multiplication will be happy to learn that IBM has come to the rescue with a multiplier unit which can be field-installed and is completely housed within the accounting machine frame. Either a single product or a double product unit may be used. The single product unit can multiply two factors to arrive at an eight-digit product. The double product unit can either develop a sixteen-digit product from a single multiplication, or use one multiplier with two multiplicands to simultaneously develop two eight-digit products. The product or products may be detail or group printed, transferred to storage, or summary punched.

The single product unit rents for $30 monthly and sells for $1,000. The double product unit rents for $45 monthly and is priced at $1,570.

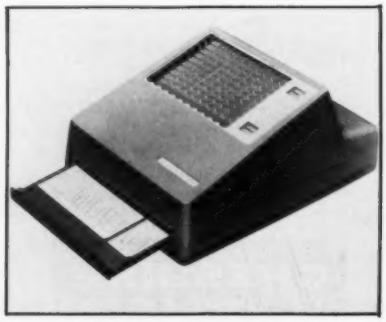
Circle no. 33 on reader service card.

DL-210

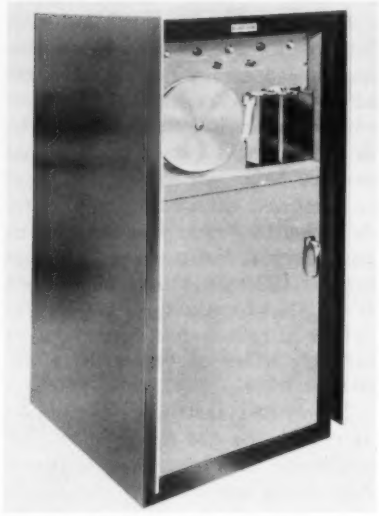
Up to 50 remote source data collection stations can be connected to one central recording station in Datex Corporation's new DL-210 business data acquisition system. Designed for labor distribution, production status, and similar applications, the system's remote stations accept data from pre-punched 80-column cards (up to 80 digits), identification cards or badges (up to 10 digits), and manual keyboard. The recording station receives this information, converts it to a computer-usable code, and punches it along with the date and time into paper tape, at 60 characters per second. Recorder output on punched cards is optionally available.

Error checking is done at both ends of the transmission, and includes parity checking.

Circle no. 34 on reader service card.



DL-210 Sending Station



DL-210 Receiving Station

IBM 604-2

IBM has announced a new version of its 604 electronic calculator. The 604-2 has the same features as the standard 604, but operates at 50 cards per minute, rather than at 100 cards per minute. Rental has been reduced to $330 a month for the 604-2, in contrast to $550 for the standard 604. Like the standard model, the 604-2 consists of two cable-connected units — a 521 read/punch unit and a 604 calculating unit — and may be wired for twenty program steps in its basic capacity. Additional steps up to sixty are optionally available.

Circle no. 35 on reader service card.

FACSIMILE SYSTEMS

A group of new, higher-speed facsimile scanners and recorders has been developed by Alden Electronic and Impulse Recording Equipment Company, Incorporated. The new units are designed for use in broad channel communication links such as microwave and AT&T's "Telpak," and may be used with tape storage and conversion equipment. The chief feature of the new system is increased speed. With a recording

speed of 960 rpm, and using the 19-inch wide recording head which is standard for weather maps and which Alden recommends for business use, two business letters (or other material of equivalent size) may be transmitted in one minute. A continuous flat copy scanner unit, also developed by Alden, handles any width of copy in continuous lengths.

Circle no. 36 on reader service card.

TELEX

Western Union has expanded, in May, its Telex dial-telegraph system to 19 cities in the United States, in addition to the New York, Chicago, Los Angeles and San Francisco exchanges which were placed in operation in 1958. The expansion is part of the construction of a nation-wide Telex system which will include automatic exchanges in 181 cities. New Telex subscribers can now communicate with 140 points in Canada and Mexico, and future plans call for linking up the North American network with Telex networks in South America, Europe, Africa and Asia.

Telex operation

Each subscriber is equipped with a page-type Telex machine and the associated dial unit provided by Western Union. All other wiring and exchange equipment is located at Western Union's main office.

A call is made by depressing a start button and dialing a five or six-digit number. The connection, made immediately after the last number is dialed, is indicated by a light and the starting of the teleprinter motor. A connection can be terminated from either end. If a called subscriber's number is busy, a signal cuts off the calling subscriber's equipment.

The Telex keyboard is equipped with an "answer-back" unit which is coded to automatically transmit an identifying abbreviation of the subscriber's name and city. This unit is activated remotely by striking a "who are you" key. Normally the calling subscriber transmits the "who are you" signal, receives the answer-back identifying signal, and then depresses a key identifying himself to the distant subscriber.

For Telex subscribers who require preparing, transmitting or receiving on perforated tape, a special Telex machine is provided. This unit has a built-in tape perforating and transmitting attachment. A control unit allows the printer to be used for advance preparation of messages or data on tape prior to connection with a distant subscriber. In the event of an incoming "call" during tape preparation, the machine is automatically switched into operation to receive messages, after a warning signal is received.

With this special Telex unit, transmission may either be from the keyboard itself or from the tape fed through the transmitter device. As they are transmitted, all messages and data are simultaneously recorded on the printer in page form.

Telex charges

There is a basic $35.00 monthly service charge plus transmission charges based on the usage measured in automatically recorded "pulses." An additional $30.00 per month is charged for automatic tape transmission equipment.

Since there is no minimum time charge, there is no need for the subscriber to "store" his messages. Each pulse is charged for at a fixed rate of 2½ cents. For example, a one-minute Telex call between Detroit and New York City would cost 65 cents, or a one-minute Telex call between Detroit and Los Angeles 80 cents.

Circle no. 37 on reader service card.

■

PRODUCTS AND SERVICES

TWISTOR MEMORY

A new type of memory is being developed for telephone switching equipment by Automatic Electric Laboratories. The memory device is built around the "twistor," which operates in a manner similar to a ferrite memory core. The twistor is composed of a copper wire, about the diameter of a human hair, helically wrapped with a flattened permalloy wire. It is expected that assembly of twistor arrays will be faster and less costly than ferrite core matrix fabrication.

Circle no. 40 on reader service card.

FORMS STORAGE

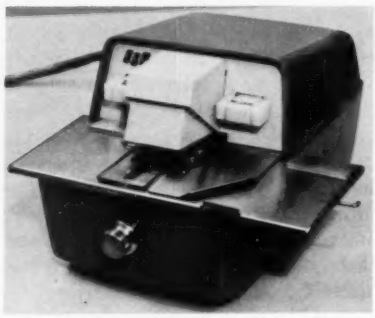
For permanent storage of punched office forms, Office Equipment Manufacturing Company has a combination carton and binder called Perma Snap Bindr. The rigid, fibre-board cartons come with ⅛" flexible nylon posts or 3/16" aluminum posts, and give full protection against dust, dirt, and moisture.

Circle no. 41 on reader service card.

NEW AMPEX CORE MEMORY

Ampex Computer Products Company has announced the RQL, a ferrite core memory with a capacity of 1,024, 2,048, 4,096, 8,192, 16,384, or 32,768 words of eight to 60 bits. The unit is non-synchronous and all bits of a word are handled in parallel. Memory cycle of the RQL is 6 microseconds; access time is 2.5 microseconds. The unit operates with a self-contained power supply from a 115 volt AC wall outlet, over a temperature range from —10 degrees centigrade to +60 degrees centigrade, under humidity conditions to 95%.

Circle no. 42 on reader service card.



The Typetronic reader (above) is one of the key products in the new line of components now available to data processing manufacturers from Smith-Corona Marchant Inc. This well-styled unit will read five to eight channel punched paper tape or edge punched cards photoelectrically, at the rate of 30 characters per second. The reader is capable of handling oiled or unoiled tape as well as standard colored tape.

SCM DATA PROCESSING COMPONENTS

Smith-Corona Marchant Inc., manufacturers of Typetronic data processing equipment, are expanding their marketing activities to include the sale of components to manufacturers of data processing systems. Principal products in the new line include photoelectric readers for five to eight channel paper tape or edge punched cards; paper tape punches; and heavy-duty input/output console typewriters.

Circle no. 43 on reader service card.

NCR PACKAGE PROGRAMS

The National Cash Register Company is providing a new computer service for companies which do not have computers. NCR has developed generalized package programs for several standard business applications. By using a low-cost NCR tape punch in conjunction with cash registers, accounting and bookkeeping machines, and adding machines, a small company can gather data which can be sent by mail to one of three NCR data processing centers, at New York, Dayton, or Los Angeles. Each center is equipped with an NCR 304 computer. Resulting reports are returned to the company, usually within 48 hours or less.

Complete sales analyses for industrial firms start at $100 a month for up to 4,000 transactions, with a surcharge of $20 for each additional 1,000 transactions to be analyzed. Sales analyses and merchandise control reports for retail stores will range from $2.25 to $6 per 1,000 transactions.

Circle no. 44 on reader service card.

THREE NEW MODELS FOR MANAGEMENT

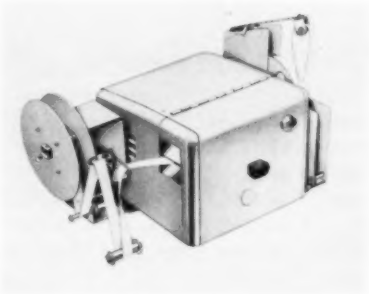
Computer programs which provide mathematical models for solving project scheduling, inventory control, and capital investment problems have been developed by IBM. Most of the programs are written in FORTRAN, and are therefore usable on any machine capable of working with FORTRAN statements.

The project scheduling program is called LESS (least cost estimating and scheduling), and includes three routines which can be used separately or in combination. The first routine is used to set up in mathematical terms the interrelationships of all the operations required to complete the project to be scheduled, including the time required for each operation and each operation's logical place in the project sequence. The second routine schedules the project by calculating the earliest and latest times any operation can start and finish in order to complete the project in the shortest time period. The last routine mixes time and cost factors to produce time and cost estimates.

The Inventory Management Simulator is a program which is used to construct a mathematical model of a firm's inventory system. This model can then be used to test the effects of changing external factors, such as demand, and of changes in the firm's inventory policies.

The Capital Investment Program is used to evaluate investment proposals and calculate the yield of the investment.

Circle no. 45 on reader service card.



LARP TAPE PUNCH

A new paper tape punch, called the model 28 LARP, has been developed by Teletype Corporation to receive parallel-wire input from message communications equipment and business machines. The punch is available for five, six, seven, or eight channel operation, and has a speed of 20 characters per second.

Circle no. 46 on reader service card.

PB 250

Packard Bell Computer Corporation has announced that its first production model PB 250, installed at the Bailey Meter Company in January, has been in continuous operation for over 1,600 hours without interruption or error. This PB 250 digital computer is being used at Bailey in an automatic control system for electric power generation. Fifteen other PB 250 computers have been delivered.

Circle no. 47 on reader service card.

202A DATA-PHONE

The Bell System's new 202A Data-Phone unit, to be available this fall, is a revised version of the series 200 model 3A, and is the first of a series of new housings for the four Data-Phone series. Three integrated designs, differing only in size, will be offered. In the integrated designs, including the 202A, both the phone and the transmission set will be housed in the same unit.

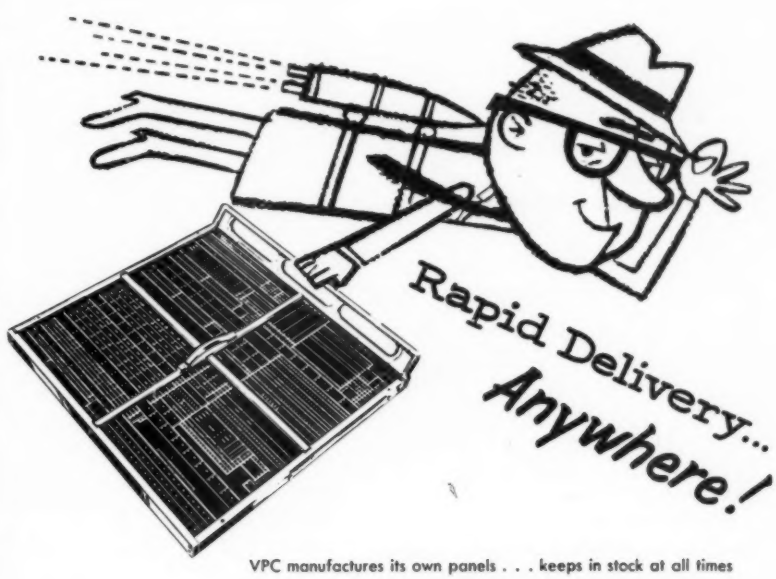
Two newly designed non-integrated units have also been developed for customers whose requirements call for physical separation of the telephone and the transmission set.

Circle no. 48 on reader service card.

CONTROL PANEL CONVERSION

A conversion kit offered by IBM allows a 901 jack-type control panel to be changed into a 905 self-contacting panel at the customer's location. The 901/905 panels are the single-section panels used with the 63 card-controlled tape punch, 77 collator, 514 reproducer, 523 summary punch, 549 ticket converter, and 552

(continued on next page)



VPC manufactures its own panels . . . keeps in stock at all times a complete line of quality-proven panels and wires . . . for the smallest installations to the largest and most modern IBM machines.

Shipment is made within 24 hours from stock. In case of rush orders — over-night delivery is made. A stock of control panels maintained at various locations throughout the country also assures prompt delivery.

When you want superior quality in Control Panels and Wires — unconditionally guaranteed — fast — get in touch with us.

VIRGINIA PANEL CORPORATION
WAYNESBORO, VIRGINIA

Wherever there's an IBM installation there's a VPC Representative nearby.

Manufacturing Plant located within over night delivery via normal overland transportation of over 60% of IBM installations in the United States.

VPC

VIRGINIA PANEL CORPORATION
Dept. DP • Waynesboro, Virginia

Yes, please send me complete details on outstanding features of VPC Panels, Covers and Wires

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE_____ STATE_____

Circle no. 32 on reader service card.

interpreter. The new 905 control panel completes IBM's line of self-contacting panels, and is priced at $19 without cover. Manual covers are $6; fixed are $2.50. The conversion kit is $7, and there is no charge for installation.

Circle no. 49 on reader service card.

NEW IBM RESEARCH CENTER

IBM has dedicated the Thomas J. Watson Research Center at Yorktown, New York, the world's largest research center for the study of computer science. A three-level, crescent-shaped structure with a curving glass front of over 1,000 feet, the center provides 459,000 square feet of space for 1,500 scientists and supporting personnel, whose work will be primarily basic research. The center contains a computing laboratory equipped with an IBM 7090 and two other electronic data processing systems.

Circle no. 50 on reader service card.

ITT BANK EQUIPMENT

Valley National Bank, Phoenix, has begun operating a complex of special bank document handling equipment manufactured by International Telephone and Telegraph Corporation. Checks, drafts, deposit slips, and other paper from the bank's 27 branches are brought to its Operations Center by armored car messenger and fed into an "encoder" which inserts each piece of paper into its own transparent plastic envelope while a keyboard operator codes an account number and amount, which are written on a magnetic strip across the top of the envelope. Encoded data for checks from other banks include Federal Reserve district number and member bank designation. Verification is accomplished at a second machine. A "prime sorter," a sorter, and a lister complete the ITT machine complement and accomplish the sorting, merging, calculating and listing operations common to most banking applications. The paper documents are automatically removed from their plastic envelopes while passing through the lister.

Circle no. 51 on reader service card.

PRESSURE-SENSITIVE LABELS

American Tag Company announces the availability of new self-adhering labels for use with data processing machines.

These labels require no moistening. Fingertip pressure fixes them securely to material such as paper, wood, metal, ceramic, plastic, glass, etc. Carried on a marginally-punched, continuous, fan-folded or rolled strip, these labels can be used on any integrated data processing machine with a pin-feed platen or tractor feed. Imprinted at high speeds from punched cards, punched or magnetic tapes, etc., they can be used for applications such as addressing, correcting, coding, and inventory and production control. Since the labels are printed directly from cards or tapes, they require no proofreading.

Available in different widths and depths, and supplied singly, doubly or triply across the fan-folded or rolled carrier strip, the labels can be fed and applied automatically or by hand. The protective backing strip peels off quickly and easily. Labels are furnished blank or printed as desired.

Circle no. 52 on reader service card.

DATA PUNCH

Data can be recorded at their source on punched cards with Addressograph - Multigraph's portable Data Punch. The two and a half pound machine, with dimensions of 8½ x 4¼ x 1½ inches, also imprints the data at the same time they are being punched.

After inserting a punched card into the Data Punch, the area to be punched is selected by means of a field indexing gauge. Data to be punched and printed are entered by positioning a series of keys, and appear on dials for quick visual verification. A lever is then pushed to cause punching and printing. Eighty column, 51 column, or multiple part card sets may be used.

Circle no. 53 on reader service card.

SBC ADDS COMPUTERS

Thirty-three IBM 1401s and two IBM 7090s have been ordered by The Service Bureau Corporation, an IBM subsidiary with 70 offices throughout the nation. SBC is currently using a full range of IBM data processing equipment, including unit record, data plotting, and MICR equipment, and 650, 1401, 7070, 704, 709, and 7090 computers. One of the new 7090s will be installed in San Jose this year, the other in New York in 1962. Pending its own 7090 installation in New York, SBC is contracting for use of a 7090 already installed elsewhere in the city.

SBC features pre-planned, generalized programs for its computers. These programs are easily modified to serve specific customer needs, and have been developed for such diverse problems as bank demand deposit accounting, piping flexibility analysis, high school report cards and registration, parts inventory control for automobile dealers, and dairy route accounting for retail milk distributors.

Circle no. 54 on reader service card.

Shown here as the apex of a pyramid representing the programming package for the solid state IBM 1401 computer are the newly-announced 1401 COBOL, Autocoder and Input/Output Control programming systems. The boxes contain decks of punched cards which, when fed into the computer, instruct it to follow the necessary steps for performing a wide range of data processing operations.

1401 PROGRAMMING SYSTEMS

Three new programming aids will be offered by IBM to users of its 1401 computer. A 1401 COBOL system will be available early in 1962 for 1401s with 8,000, 12,000, or 16,000 character core storage, and later that year for 1401s with 4,000 positions of storage. Regardless of memory size, a 1401 system must include magnetic tape drives and some special features in order to use COBOL. The availability of COBOL will mean the possibility of writing 1401 programs in statements which closely resemble ordinary English language usage and syntax.

A 1401 Autocoder system is now available and may be used with any 1401 configuration. Similar to the Autocoder systems used on other IBM computers, and to the SOAP systems used with the IBM 650, the 1401 Autocoder is a symbolic-language assembly program which translates mnemonic abbreviations into machine-language instructions and assigns memory locations.

The Input/Output Control System (IOCS) will be available for all configurations of the 1401 in the third quarter of 1961. The IOCS schedules all 1401 input and output operations with four commands: "GET," "PUT," "OPEN," and "CLOSE."

Circle no. 55 on reader service card.

POWER SOURCE

Litton Industries is producing a portable power supply, with mobile console and cooling system, which can provide 300 to 600 watts of CW or modulated R. F. microwave power in frequency ranges from 350 MC to 10.5 KMC. Designated L-3653, the equipment has been field used as a power source for high power testing of microwave components and systems and as the R. F. driver for high power microwave amplifier tubes.

Circle no. 56 on reader service card.

COMPUTERAMA

The Royal McBee Corporation has installed both an RPC-4000 and an LGP-30 in each of four tractor-trailer units which the firm will use to demonstrate its computers to management groups throughout the United States. Called "Computerama" trailers, they will be driven directly to, or in the vicinity of, smaller businesses which are located away from the large computer centers. The managers of these businesses will be able to study the operation of the two computers with a minimum of time required for travel to and from the computer site.

Circle no. 57 on reader service card.

MULTI-PURPOSE COLLATORS

Automated Business Machines Corporation is marketing a new line of collating equipment which executes a variety of tasks at speeds up to 5,000 cycles per hour. The ABM collators can gather sheets, folders, and signatures, and perform operations such as inserting cards or letters of transmittal into magazines or booklets.

Circle no. 58 on reader service card.

PATTERN CONVERTER

The Rabinow Pattern Converter converts any display, such as oscilloscope, map, or chart, to digital language. Output can be punched cards, paper tape, or magnetic tape, or the equipment may be used for on-line input to any specified computer.

Circle no. 59 on reader service card.

MICROFILM COPY DEVICE

Rollacopier, marketed by Andrews Paper and Chemical Company, is a compact combination of a microfilm reader, an enlarger printer, a wall projector and a contact printer. The device uses special paper to produce stabilized silver images of high contrast and sharpness of detail. Rollacopier 17 produces prints up to 17 by 22 inches and costs $595; Rollacopier 9, at $395, produces prints up to 9 by 14 inches.

Circle no. 60 on reader service card.

(continued on next page)

DYKOR TAPE HANDLERS

Digitronics Corporation has two new bi-directional paper tape handlers designed for use with the company's Dykor 3500 and B3500 photoelectric tape readers. Each model handles 1,000 feet of five to eight level 4 mil tape interchangeably, model 4588 at up to 150 characters per second (15 inches per second) and model 4599 at up to 250 characters per second (25 inches per second). Suitable for standard rack mounting, each handler weighs 35 pounds and has dimensions of 19 x 14 x 8¼ inches.

Circle no. 61 on reader service card.

DATA STORAGE DEVICES

Two new Bernoulli Disks, which operate reliably under extreme environmental conditions, were demonstrated at the Western Joint Computer Conference by Laboratory For Electronics, Inc. The units consist of single disks of thin, flexible Mylar magnetic tape mounted on a shaft which spins the disk between a backplate, containing read/write heads, and a stabilizing plate.

The BD-500 has a capacity range of from 500,000 to two million bits, depending on the number of disk and head assemblies mounted on the shaft and on the recording technique used. The BD-200 has a capacity of from 200,000 to 800,000 bits.

Circle no. 63 on reader service card. ■

NOTABLE QUOTES

● "As last year ended, a particularly bad piece of reporting was foisted upon a large and influential segment of the population.

"In this article, computers were pictured as grossy irresponsible machines which were overpriced, oversold and overrated. An inaccurate, undocumented illusion was created to the effect that a majority of computer users were unhappy with their equipment and were just looking for an excuse to shove everything out of the nearest window . . .

"These machines are here to stay. They are not sacred cows but they, and the people who build them and use them, are entitled to a fair shake. And a fair shake in this case would have been a more accurate, complete, organized job of reporting than what was found in the Wall Street Journal article, 'Bugs in Automation', appearing on December 27." *Editor's Readout*, **Datamation**, February, 1961.

● "Computers coupled with a nationwide communications network one day will be used to overcome business cycles. However, at this time management concepts that would produce the kind of improved mathematical inventory formulas to be fed to such a system are still many years away."

A. C. Nesse, at the national conference of the American Institute of Industrial Engineers, Detroit, May 11-13, 1961.

● "It should be obvious that computers do not by themselves solve problems — they only compute. If you know what your problem is, and if you can devise a method by which the problem can be solved by computation, then the electronic computer can be used as a very powerful tool to obtain a solution. But if you do not understand the problem, or if you cannot devise a method to solve it using arithmetic, then any electronic computer is just so much excess baggage. Remember that each achievement of a so-called 'Giant Brain' is actually the product of some man or group of men who devised the method that was utilized.

"Thus, we can see that the future impact of the electronic computer is restricted primarily by the limitations of our knowledge of ourselves and our environment. Surely if we can gain an understanding of problems of the complexity of language translation and of the processes of learning, then we can begin to gain an understanding of the difficult problems that face the executive. But none of these problems will solve itself — someone must solve each of them!"

E. W. Martin, Jr., *The Widening Potential of the Computer*, **Business Horizons**, Winter, 1958.

● "Many years ago, H. G. Wells in one of his books coined the phrase 'Adapt or Perish.' It was a dispassionate statement of fact that in a changing world, men also must change their mental attitudes and adapt themselves to new conditions. There can be no compromise. Existing circumstances, new developments and their bearing on the future must be acknowledged and must be used for the benefit of humanity. It is useless to muddle through, or to just hope for the best. Nature is supremely indifferent to whichever way we choose to go; it is immaterial to her whether we survive or destroy ourselves. The dinosaurs were probably quite happy wallowing in the primeval swamps, secure in the knowledge that they were lords of creation, all unknowing that their midget brains made them unfit to survive. So they vanished, because of their inability to adapt.

"We are the dinosaurs of the present. Governed basically by men who have to be dragged kicking and screaming from one scientific and humanitarian truth to another, persuaded by the bird brains of the Admass generation to worship at the shrines of false gods, threatened by the prostitution of practically every new discovery to warlike ends, we are wrapped around by a comfortable mental fog which prevents us from peering too closely toward the future. There is no indication that Nature looks upon us with any more kindliness than she did toward other forms of life that were not willing to adapt. A cosmic and indifferent shrug is the best we can hope for."

Editorial, **Automation Progress** (London), February, 1961.

NEWS SUMMARY

FINANCIAL

Transdata, Inc., a group of senior data handling specialists, has bolstered its financial position through the sale of a block of common shares to an eastern private investment group.

Comptometer Corporation's profits for the first quarter of this year amounted to $238,281 as compared with year-ago $167,015.

NCR reports first quarter sales up 15 percent with net earnings up nine percent over same period of 1960.

Electronic Engineering Company of California reported 13 percent increase in net profits for the past year over 1959.

Friden Inc. board declared a 10 cents a share quarterly dividend on common stock.

International Telephone and Telegraph Corporation predicts that electronic parts industry will register sales gains over 1960, though there will be a progressive squeeze on profit margins for the balance of this year.

NEW USERS AND USES

Bell Telephone Laboratories have programmed a computer to speak, sing and recite Shakespeare. The synthetic speech resulted from typing of phonetic symbols on keyboard or instructions from punched cards.

University of Rochester described pioneering work in use of computer to compile information on cancer cases to a meeting of the Society of University Radiologists in May.

University of Alabama has installed a Univac SS Step 80 Tape system, first installation of its kind, for use of students in education and research, applications in student accounting, payroll, and registration.

RCA showed model of computer controlled television station business procedures under computer control, at national Broadcasters Convention in May.

RCA is using its 501 system to keep track of millions of electron tubes, approving shipments and preparing reports on several hundred types of tubes in production.

Aetna Finance has signed a lease for an RCA 301 to process paperwork from 142 branch offices.

Spiegel, Inc., has ordered 200 automatic order writing machines from Ferranti-Packard Electric Ltd.

The Diners' Club ordered Dashew's new electronic imprinter for distribution to most of the Club's 65,000 charge establishments.

OH!

Alden Electronic & Impulse Recording Equipment Co., Inc. presented to the Sub-Committee of the Senate Appropriations Committee on Post Office-Treasury a plan for "Next Hour" delivery of high priority mail, using facsimile techniques the firm has developed.

The Bureau of the Census marked the tenth anniversary of their computer, Univac I Serial Number 1, on March 31. This was the world's first commercial electronic computer.

OEMI's Business Equipment Exposition (May) drew over 53 thousand top business management people; visitors to the exposition were in a buying mood and a number of on-the-floor sales were reported.

(Continued Next Page)

ACM of Washington, D. C. has interested 300 students from nine high schools in taking computer programming courses.

SERVICE CENTERS

GPL Division of General Precision has linked AT&T's centralized record center to offices a mile away.

Honeywell has opened a new service bureau at division headquarters in Wellesley, Mass., and plans a second bureau at the University of South California in August.

C-E-I-R, Inc. has a new business service center in San Francisco and another at Houston, Texas.

EXPANSIONS

Honeywell has undertaken a major expansion of the New York branch sales office, headquarters of the division's brokerage and insurance sales.

El-Tronics, Inc., acquired all of the stock of Belz Industries, Inc., the second acquisition of E-T in a month.

C-E-I-R has another economic merger, this time with Tabulating and Business Services, Inc.

Philco Corporation opened a new building at Fort Washington, Pa. in April, to be used for large and complex communications systems development for government and industry.

Jonker Business Machines of Maryland opened a New York City sales office.

Auerbach Electronics Corporation expanded to occupy all six floors of its building; the extra two floors will accommodate the growing Systems Engineering and Programming activities, and the new Programmed Teaching Group.

RCA doubled the capacity of its Needham plant to meet rising demands for memory systems.

NCR is having a major expansion of marketing facilities for electronic data processing systems. By the end of the year the broadened program will give the company computer specialists in 60 major cities; eight regional offices will direct activities in the 240 cities in which NCR has branch sales offices.

General Electric's Defense Electronics Division is reconstituting two departments to keep pace with changing defense requirements in the missile and space age.

FOREIGN

Honeywell is opening a British electronic data processing office to market Honeywell computer systems in western Europe and will have a London service bureau.

C-E-I-R, Inc., has acquired 42-1/2 percent of the capital stock of Centre Francais de Recherche Operationnelle of Paris, for a French affiliate.

PWI

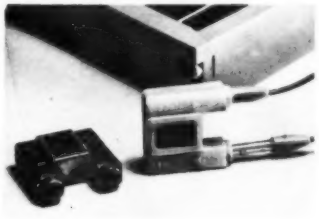
"001" KEY PUNCH

A key punch at your fingertips . . . personalized . . . convenient . . . time saving. PWI offers you the "001", a high precision punch of well proved design—entirely mechanical in operation—priced within a range where purchase on a personalized-use basis can be well justified.

This is a compact punch . . . needs only a small space on your desk top or on computor console. It weighs only a few pounds . . . is easily carried wherever needed. The one-piece solid aluminum base is light in weight yet provides substantial thickness and the solid "feel" every good mechanical key punch must have.

The PWI "001" is being widely used as an extremely handy auxiliary punch . . . for example to replace damaged cards immediately without need to interrupt normal key punch routine. The numerical keyboard is standard design with fourteen keys which include those for space and release. For your convenience, character codes are engraved on the cover plate. Tab stop with quick release and calibrated gear rack make it easy to set card to desired column. Alphabetic or multiple punching is possible without back spacing. Operation is simple—positive—straightforward!

PWI FILTERS for electronic and electro-mechanical computors and tabulators.



Two new PWI filters for elimination of back-circuit "Feedback." Designed for convenient installation. Molded in durable plastic for protection against moisture and physical damage. Two types:
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DELTA for lighter loads and electro-mechanical machines.

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PEOPLE

PLACES

Hugh L. Clary

CLARY CORPORATION appointed *W. E. Raub* as resident manager, computer sales at Washington, D. C. *Hugh L. Clary* became chairman of the board, relinquishing the presidency he has held for 22 years. *William G. Saenglein* succeeds to the president's position.

CONTROL DATA CORPORATION created a new position, director of computer applications, to which *Dr. Clair E. Miller* has been appointed.

DASHEW BUSINESS MACHINES has a new executive vice president in *John H. Humphrey*. Vice president of administration is now *Allen T. Beall.*

ELLIOTT INDUSTRIES elected *Reginald M. Melhuish* as managing director of Elliott Business Machines, Ltd., of England.

ELECTRONICS ENGINEERING COMPANY has a new board member in *Frederick E. Hines*. Returned to office as corporate directors were *Burgess Dempster, Robert B. Bonney, Donald R. Blair, W. R. McQuiston, T. W. Jarmie,* and *W. VanAlan Clark Jr.*

HONEYWELL has appointed *Paul Colen* as manager of COBOL development. *J. B. Parsons* has become manager of the state and local government department of the marketing division. A special sales department to serve the brokerage business has been created with *E. Stanley Peters* as its manager.

S. E. D. MEMORIES, INC., has two new managers in *Edward J. Foster* and *Daniel A. Giffin.*

WATTS BUSINESS FORMS appointed *Bernard Barish* district sales manager for New York City and Long Island.

NATIONAL OFFICE MANAGEMENT ASSOCIATION, at its 42nd International Conference and Exposition, elected *Dr. J. R. Taylor* of Wayne State University its international president. The NOMA Fellowship award went to *William A. Patterson* of United Air Lines; the Leffinwell Medal award was given to *E. J. D. Rutherford* of Vancouver, B. C.

THE OFFICE EQUIPMENT MANUFACTURERS INSTITUTE elected *Harry C. Anderson* president.

SOUNDSCRIBER CORPORATION announced the appointment of *Edgar A. Herrman* as national accounts manager.

REMINGTON RAND UNIVAC announced that *Robert A. Keyer* has been promoted to area marketing manager and *Paul V. Csaszar* to branch manager (Chicago); *Richard F. Redfield* was appointed branch manager in Milwaukee. At St. Paul, *V. J. Groth* joined the systems programming department.

RADIO CORPORATION OF AMERICA named *J. L. Albers* as vice-president, distributor operation services, and *John R. VanDyke* as Boston branch manager for the EDP division.

INSURANCE ACCOUNTING AND STATISTICAL ASSOCIATION'S mid-Atlantic chapter elected *George R. Boyer* president.

LITTON INDUSTRIES named *Allen S. Dunbar* manager of space flight activities at their Maryland division.

ADVANCED SCIENTIFIC INSTRUMENTS, INC., a new Minneapolis firm specializing in digital electronics and computing instruments, announced *Thomas S. Steele* and *William L. Borgerding* as members of their technical staff.

AUERBACH ELECTRONICS CORPORATION has a new technical staff member in *Alfred Gartenhaus,* a program designer. Heading the new Programmed Teaching Services group is *Dr. Donald H. Bullock.* This group will work on the application of self-instructional programmed teaching techniques in industry, government, the military, and education.

BURROUGHS CORPORATION has named *Yougene J. Lamar* as director of Product Planning—Data Processing Systems (Pasadena). *Donald E. Young* has been elected by Burroughs' board of directors as assistant vice-president-general.

C-E-I-R has sent *Winston Riley III* to its London center to head operations research as project manager.

INTERNATIONAL BUSINESS MACHINES elected *Thomas J. Watson, Jr.,* chairman of the board; he will continue as chief executive officer. Succeeding as president is *Albert L. Williams,* formerly executive vice president and director. *T. Vincent Learson* was elected to the board of directors. *Arthur K. Watson* was elected to the executive and finance committee and *H. Wisner Miller, Jr.* was promoted to vice president and group executive. ■

Thomas J. Watson, Jr.

Albert L. Williams

DeParis

(continued from page 6)

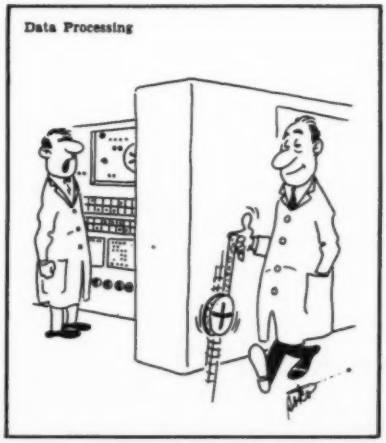
reels are removable from their handlers. The capacity of each cartridge is 5,600,000 alpha or 8,300,000 numeric characters.

Within the cartridge there are eight rods from which the cards are suspended lengthwise. Each of the 256 cards in each cartridge is independently addressable. Upon demand by a program command, the selected card is dropped from the rods and wrapped around a revolving drum. While wrapped around the drum, the stripes or tracks can be read or written on, one at a time, by the read-write head associated with the drum.

To drop a card takes 170 milliseconds. Each revolution of the drum takes 43 milliseconds; to read all seven channels takes seven revolutions. The drop time is shareable by looking ahead, i.e. if when writing the program, you give the drop instruction 170 milliseconds before you need to read it, other instructions may be executed while the physical drop is occurring.

Data is organized on magnetic cards in the same fashion as on tape. Density is about 250 characters per inch. The transfer rate from drum to memory is 150,000 digits per second.

Especially when files are small or when random access is part of your need, CRAM will be better than magnetic tape. One of the appealing facets is that you can put multiple files in a single cartridge rather than on individual short reels which have to be separately mounted and dismounted. Another is that the file can be processed in random or sequential order; still another is that sorting is feasible with a CRAM unit.



"FRIDLY! WHERE IN THE BLAZES IS THAT REEL OF PROGRAM TAPE?"

Support packages

NCR support packages include scientific and engineering library routines and all standard service routines. Automatic programming includes COBOL and NCR's own system, NEAT 315. Debugging circuitry and routines such as trace routines are built into the 315.

Rentals range from $3,000 for a card system to $28,000 and higher for a large scale tape/CRAM configuration. Each CRAM rents for about $950.

That's about the story of National's 315 which seems to be another strong challenger for a share of the computer market. Priced very competitively, the system allows modular increases without necessitating factory changes. Apparently, a customer for a small scale 315 can expect the system to absorb his growth without moving to another series or being involved in program rewriting.

One comment in conclusion. Computers are getting to be like automobiles. It is doubtful that there is a bad general purpose computer of the new generation on the market. Some offer advantages in price, some in processing ability. Some have random access in one form, others have it in some other form or not at all. Some are buffered, some use time-sharing. Speeds of input-output vary from system to system.

Most of the systems available are likely to do your particular set of applications. What are the considerations in narrowing down to a final selection? Among many are price, manufacturer's reputation, services, and support, and availability of back-up equipment in case of breakdown. Another consideration is ability to expand the system without extensive program rewrites. Certainly another is, not input speed or output speed, but the estimated throughput speed, the time which it takes to process, for instance, a day's work. Throughput is the best measure of the total system operating on *your* work.

Remember the good old days (about seven years ago) when going computer was a simple choice between one or two systems? Oh well! ■

DATA . . .
yours for the asking

THE SERVICE BUREAU CORPORATION has available a technical bulletin describing a computer service to evaluate rocket fuels and propellants. General specifications of the service, thermodynamic data available, subroutines used to improve the probability of convergence, and the processing schedule are discussed.

Circle no. 70 on reader service card.

PHILADELPHIA NATIONAL BANK's conversion of a conventional installment payment operation to low-cost automatic input without customer inconvenience is detailed in an illustrated case study.

Circle no. 71 on reader service card.

CHESHIRE's literature on their high speed automatic labeling machine, colorfully illustrated, describes how the rotary head Model E machine applies address labels to post cards, envelopes, pamphlets, and quarterfold tabloids. The machine labels printed pieces from 3¼ x 5¼ inches to 11 x 14½ inches at controllable speeds of 4,500 to 16,000 an hour. It automatically feeds and applies all labels (continuous pack form, roll strip, Addressograph electronic fascimile printed strip, IBM 407 strip, and cut or individual labels) which are preaddressed from punched cards, plates, stencils or magnetic tapes.

Circle no. 72 on reader service card.

MINNEAPOLIS - HONEYWELL's Electronic Data Processing division has published a brochure describing its EASY automatic programming aid for the Honeywell 400 system. EASY (Efficient Assembly System) simplifies the programming task by eliminating the need for the programmer to be completely familiar with the complex language of the machine. It allows instructions to be written in elementary symbolic tags and three-character mnemonic codes,

(continued on next page)

and incorporates problem solutions (such as sort routines) into a program. Automatic error diagnosis is built into EASY.

Circle no. 73 on reader service card.

CUMMINS - CHICAGO, in "Check Canceling Procedure" details the best method to use for each different system of check processing. The new booklet explains why careful consideration is now required to arrive at a canceling method which will work most efficiently with whatever system of processing may be used. It covers completely automated check processing systems, as well as handling punched card or traditional procedures.

Circle no. 74 on reader service card.

THE WESTREX COMPANY, a division of Litton Systems, has a new 12 page illustrated booklet which gives the details of Pressfax, a precision facsimile transmitter and recorder.

Circle no. 75 on reader service card.

DATEX's new brochure details the DL-210 data acquisition system. The DL-210 provides a low cost system to report and collect data as they occur.

Circle no. 76 on reader service card.

LIFE OFFICE MANAGEMENT ASSOCIATION (LOMA) has two publications on salary administration. One is the Personnel Administration Committee Report No. 12, *Salary Administration Communication,* which points out that management spends a good deal of time and money devising and administering pay plans that will be acceptable to their employees. The 43 page report describes those areas in which a company can communicate information about its salary program, and illustrates how some companies get better acceptance for their salary programs.

Circle no. 77 on reader service card.

LOMA's other bulletin, *Salary Administration Bibliography and Reference Guide,* contains an annotated list of books, pamphlets, reports and magazine articles published on the subject of salary administration since the guide was issued two years ago.

Circle no. 78 on reader service card. ■

BOOK SHELF

COST REDUCTION GUIDE FOR MANUFACTURING MANAGEMENT by H. Clifton Morse and E. E. Wyatt. Wyatt & Morse, Inc., 332 S. Michigan Ave., Chicago 4, Ill. 238 pages.

This guide comprises a group of questions, with space allotted for rated responses on all phases of business. The authors include discussion with each set of questions; a section on case histories, and a section on operations analysis audit. The material is a guide to organizing and promoting a cost reductions program. Rarely is so comprehensive a coverage of business functions found in one place.

Administrative methods and responsibilities of management are described in detail.

ANALOGUE AND DIGITAL COMPUTERS edited by A. C. D. Haley and W. E. Scott. Philosophical Library Inc., 15 E. 40th St., New York 16, N. Y. 303 pages. $10.00.

Primarily intended for newcomers in the computer field, this book accomplishes the objective by including a chapter prepared by a specialist in a specific field. A certain amount of duplication results from this plan, however, each article or chapter clearly explains the subject matter. The introduction ties the chapters together in a readable form.

Subjects discussed are operation, application and design of analogue computers; numbers representation, operation, and circuit elements of digital computers.

Papers are also presented on storage, input-output equipment and programming. Many references are included at the end of each chapter.

The fundamental difference between analogue and digital computers is explained in chapter 1: analogue computers use several variable physi-

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cal quantities while digital computers are instructed to calculate and consider, by conditional transfer and other logic, assorted repetitious quantities.

Numbers representation, binary point, and negative numbers in digital computers are carefully explained in chapters 5 and 7. Here is repeated the observation, found in many current books, that the popular conception of computers as electronic brains is false: A computer can only follow instructions to calculate, discriminate between conditions, and proceed in one of several directions.

The need for, and types of, storage are explained in chapter 8, with discussions of delay-line type storage, core matrices, ferrite apertured plates, ferroelectric and diode capacitor store, and drums. Briefly explained is the role of magnetic tapes for additional storage.

ELECTRONIC BUSINESS MACHINES edited by J. H. Levenson. Philosophical Library, Inc., 15 E. 40th St., New York 16, N. Y. 270 pages. $10.00.

A series of English lectures by twelve experienced electronic computer specialists is presented in three main sections: programming for business purposes, business management and electronic data processing, and computer equipment and applications. Although the original lectures were delivered in the summer of 1958, they have been rewritten with some updating to cover progress made in application of computers to business in the significant years of 1959-1960.

A goal of business, to accomplish integrated data processing, is expressed as an ideal with or without computers, and the technical limits to dumping all raw data into a computer which will spew out the required business facts are stated as an "unattainable ideal." In chapter 18, Mr. N. K. Moritz discusses this ideal under the title, Telecommunications.

Emphasis is placed on the investigation prior to a decision to use a computer. The necessity of top management support, inquisitive investigations and a carefully selected and informed analysis group is clearly stated. After the decision to use a computer is made a relatively long period of preparation is essential.

Three chapters are devoted to computer sorting techniques and flow charting, which are discussed in detail.

Under business management, chapters 8 through 14, the lectures cover business computer adjustments, selection and training of computer personnel, and problems of audit and control.

The concluding section includes discussions of input-output, magnetic tapes, punched cards and computers, and telecommunications. The editor believes the book provides answers that will be invaluable to the businessman. Developments, however, of new electronic business machines in the last two years must also be considered.

ELECTRONIC COMPUTERS by T. E. Ivall. Iliffe & Sons Ltd., London, and Philosophical Library, Inc., 15 E. 40th St., New York 16, N. Y. 1960. Second Edition, 259 pages. $10.00.

Although this book devotes four chapters to analogue computers, it contains some specific explanations of digital systems, programming, and applications of computers in the United Kingdom. The ultimate conclusion as to the future of computers — the control of factories and real-time applications — is quite different from the view held in the United States.

The history of computer developments is presented first, followed by general principles, circuitry, and storage techniques. Computer applications are briefly, and without detail, explained to be in payroll, and other data processing accounting functions.

The author presents some recent developments which include nontechnical explanations of transistors, diodes, cryotons, thin film, and parametrons.

In total the book is good reading. The original publication date (1956) is evident, and mathematical formulae so often encountered in books on computers and computer componentry are not presented. ■

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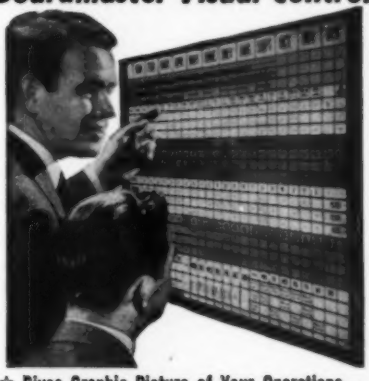

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editorial

Simulation—The Sleeping Giant

TRENDS ARE developing today in areas of American industry which encourage the advancement of management science and emphasize the use of simulation and model techniques. As these forces come into play, many of the difficulties commonly associated with bigness and complexity will disappear. The means will be available to manage business institutions, no matter how big or varied they may become. The advantages of quick reaction, which are presently thought to rest with smaller companies, can be neutralized by larger companies with the aid of simulation.

Until recently there has been a sharp difference between the accounting and engineering areas in most corporations. Since most data processing systems are part of a controlled program whose purpose it is to achieve savings, it has been possible to accurately measure the results. Not so with research and engineering since the purposes have been quite different. Here the effort is directed to the achievement of new results and the product is difficult to measure. It is acknowledged, however, that the research and engineering uses of data processing systems hold out great promise of future benefits.

It is also clear that the line which once separated engineering and accounting applications is becoming increasingly blurred. More and more engineers, accountants, operation analysts and mathematicians are learning to attack their common problems jointly with the aid of data processing systems.

It is fair to say, therefore, that data processing has become a powerful cohesive force in business management. It is helping to draw the many functional activities of the corporation together into a strong unified structure. It is clarifying the interrelationships which exist among these activities and setting the trend toward better management integration.

Progress in this area, however, is being retarded by a lack of practical tools and techniques as well as by a lack of appropriate data.

To simulate a business situation, it is necessary to have far more data than can ordinarily be gleaned from accounting statistics. The causes of business success and failure must be described mathematically, and to do this, data on such factors as market forecasts, product development costs and a wide range of related activities must be available. It is only when the problem is assessed in terms of these needs that the extent of present shortcomings can be realized.

The initiative here must come from both the user and the manufacturer of data processing equipment. There is a great need for further research in applied mathematics and business administration. Management science can be made a useful tool in American business if there is continual effort toward the development of better model techniques and a realization by business men of their value.

Several of the larger corporations have made a start in the establishment of applied mathematics groups in their data processing divisions. It is, however, not much more than a start. Simulation is a sleeping giant of incalculable value to American business but this giant is going to have to be shaken if it is to be awakened. There must be a cooperative effort between the user and the manufacturer to start the job. ■

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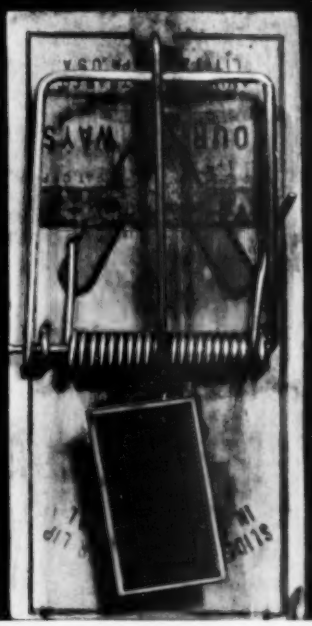
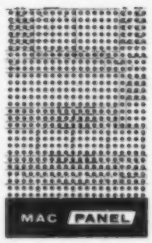


We admit it. Competition in the panel business is keen. Still, we haven't had to put out any "cheese" to bait our customers. We think we're better off concentrating on producing the best control panels and wires. That's our business. No baiting offers. We are interested in your present needs. Not five years from now. Our new products people will help you meet *those* needs. And you can be sure of the same MAC Panel quality, service and value. Probably better. Why? Because we're tab men and we'll gain experience with you. When it comes to meeting problems we'll be there. And, as in the past, probably the first to produce the products that solve them. Our efforts aren't divided among many products. We're giving the panels all we've got. We've made it our business to know data processing. Our time and effort is devoted to producing and selling products that will give you the kind of service you can rely on. What's that saying about building a better mousetrap?



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Division of Adams-Millis Corporation

MAC PANEL COMPANY, High Point, North Carolina

Representatives throughout the United States, in Canada, Latin America and in Europe

New RECORDAK DACOM System

translates computer language into plain English at speeds up to 20,000 characters per second!

Name derivation of RECORDAK DACOM System—*DA*tascope *C*omputer *O*utput *M*icrofilmer, DACOM is a trademark.

The RECORDAK DACOM System delivers incredible printout speeds which equal or exceed computer speeds . . . provides indexed microfilm records which are much easier to file and use . . . introduces important advances in point plotting and logic diagramming.

First, let's consider the importance of the RECORDAK DACOM System as a Print Out Medium.

Its great advantage in speed over mechanical printers turns lag time into productive time, allows a more continuous work flow. And its increased versatility gives you still greater return on your investment in electronic computers. Look at just a few examples of how the RECORDAK DACOM System can be applied to varied operations.

- *It optically combines* computer data with any office form design . . . gives you, for example, a complete customer statement on a single film image. Paper facsimile copies of exceptional clarity can be produced at high speed from your microfilms by photographic and other rapid copying methods.
- *It provides* the fastest, most accurate method of point plotting.
- *It records on film* logic diagrams of electronic circuits.

Graphic Arts quality

Along with increased speed and versatility, the DACOM System provides graphic arts quality in any type style you select. Look at DACOM film in a RECORDAK Film Reader and you'll find it hard to believe that the images produced from invisible pulses on magnetic tape are even sharper than the type on this page.

How RECORDAK DACOM System simplifies data storage and speeds reference

- The decoded information on as many as *eight* 2,400-ft. reels of magnetic tape can be recorded on a *single* 100-ft. roll of 16mm RECORDAK microfilm.
- RECORDAK Microfilms (inserted in magazines) can be "finger-tip" filed at convenient reference stations. Any record out of millions viewed in seconds in RECORDAK LODESTAR Film Readers. *Compare* with the time lost now searching through voluminous paper records.

Learn how the RECORDAK DACOM System may be applied to your routines

Phone or write today for interesting details on the programming of the RECORDAK DACOM for accounting, point plotting and logic diagramming. Arrangements can also be made for your group to see RECORDAK DACOM System in operation. Write Recordak Corporation, 415 Madison Avenue, New York 17, N. Y.

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